HP Firewalls and UTM Devices

Getting Started Guide

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Overview

This documentation is applicable to the following firewall and UTM products:

- HP F1000-S-EI firewall (hereinafter referred to as the F1000-S-EI)
- HP F1000-A-EI firewall (hereinafter referred to as the F1000-A-EI)
- HP F1000-E firewall (hereinafter referred to as the F1000-E)
- HP F5000 firewall (hereinafter referred to as the F5000)
- HP firewall modules
- HP Enhanced firewall modules
- HP U200-A/U200-S Unified Threat Management Products (hereinafter referred to as the UTM)

You can configure most of the firewall functions in the Web interface and some functions at the command line interface (CLI). Each function configuration guide specifies clearly whether the function is configured in the Web interface or at the CLI.

F1000-A-EI/F1000-S-EI

Overview

F1000-A-EI/F1000-S-EI a leading firewall device of HP, is designed for medium-sized enterprises.

- Traditional firewall functions
- Virtual firewall, security zone, attack protection, URL filtering
- Application Specific Packet Filter (ASPF), which can monitor connection processes and user operations and provide dynamic packet filtering together with ACLs.
- Multiple types of VPN services, such as IPsec VPN
- RIP/OSPF/BGP routing
- Stateful failover (Active/Active and Active/Standby mode)
- Inside-chassis temperature detection
- Management by its own Web-based management system and IMC

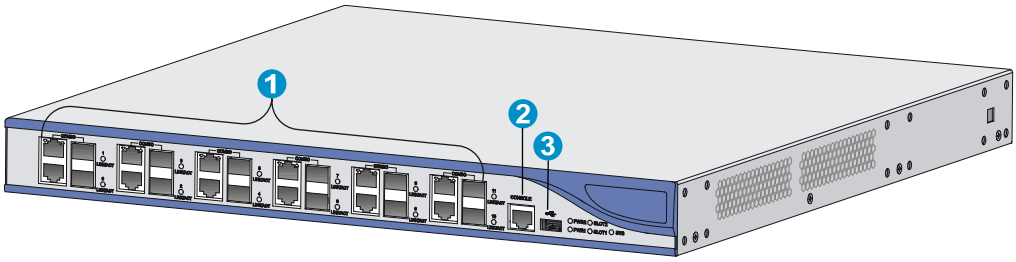
F1000-A-EI/F1000-S-EI uses a multi-core processor and provides the following interfaces:

- 12 combo interfaces, for fiber/copper port switching
- Two expansion slots, which support the 2*10GE fiber interface module (NSQ1XS2U0).

Appearance

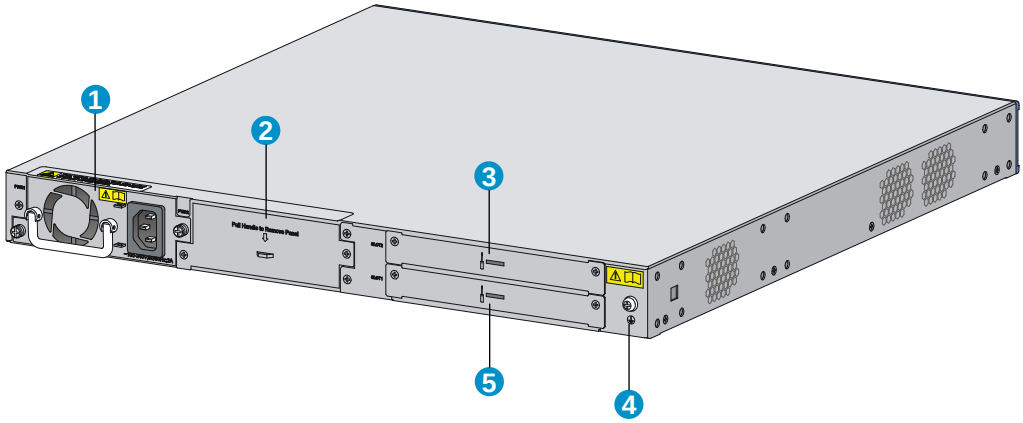
F1000-A-EI and F1000-S-EI have similar front and rear views.

Figure 1 Front view



1: Combo interfaces	2: Console port (CONSOLE)
3: USB port (reserved for future use)	

Figure 2 Rear view



1: Power module slot 1 (PWR1) (supports AC/DC power modules)	2: Power module slot 2 (PWR2) (supports AC/DC power modules)
3: Interface module slot 2(Slot 2)	4: Grounding screw
5: Interface module slot 1 (Slot 1) (A NSQ1XS2U0 interface module can be installed only to slot 1)	

F1000-E

Overview

The F1000-E is designed for large- and medium-sized networks. It supports the following functions:

- Traditional firewall functions
- Virtual firewall, security zone, attack protection, URL filtering
- Application Specific Packet Filter (ASPF), which can monitor connection processes and user operations and provide dynamic packet filtering together with ACLs.
- Multiple types of VPN services, such as IPsec VPN
- RIP/OSPF/BGP routing
- Power module redundancy backup (AC+AC or DC+DC)
- Stateful failover (Active/Active and Active/Standby mode)
- Inside-chassis temperature detection

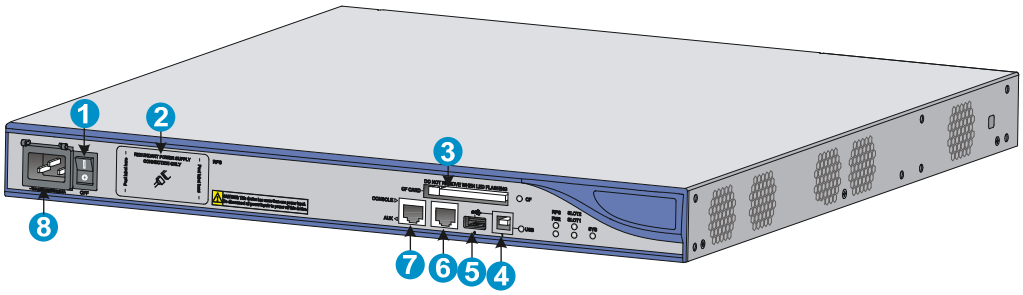
- Support for management by its own Web-based management system or by IMC

The F1000-E uses a multi-core processor and provides the following interfaces:

- Four combo interfaces, for fiber/copper port switching
- Two interface module expansion slots, which support the following interface modules: 4GBE, 8GBE, 1EXP, and 4GBP.

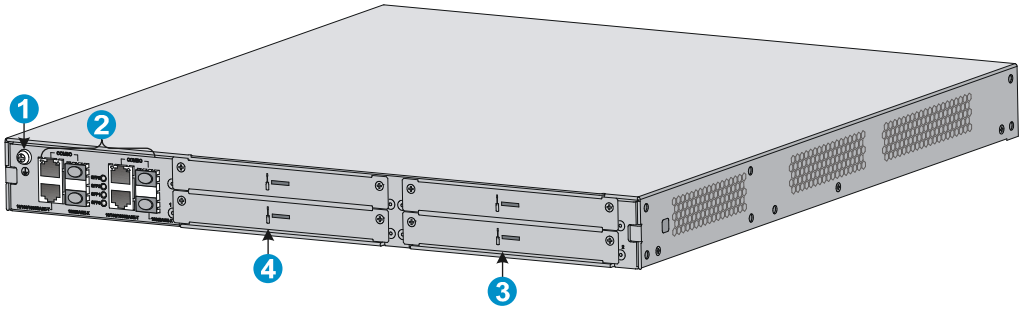
Appearance

Figure 3 Front view



1: AC power switch (ON/OFF)	2: RPS receptacle (RPS)
3: CF card slot (CF CARD)	4: Device-mode USB port 1 (USB 1)
5: Host-mode USB port 0 (USB 0)	6: Console port (CONSOLE)
7: AUX port (AUX)	8: AC-input power receptacle (–100 to 240 VAC @ 50 or 60 Hz; 2.5 A)

Figure 4 Rear view



1: Grounding screw and sign	2: Combo interfaces (0 to 3)
3: Interface module slot 2	4: Interface module slot 1

F5000

Overview

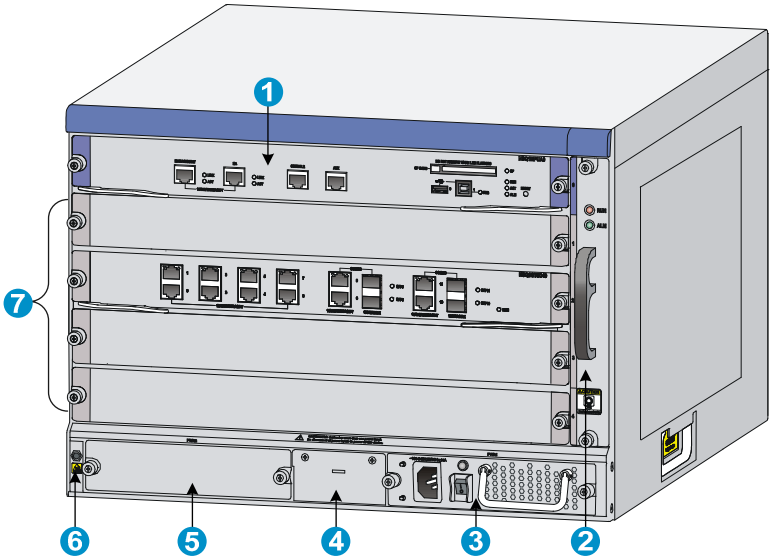
The F5000 provides security protection for large enterprises, carriers, and data centers. It adopts multi-core multi-threaded and ASIC processors to construct a distributed architecture, which allows for the separation of the system management and service processing, making it a firewall that has the highest, distributed security processing capability.

The F5000 supports the following functions and features:

- Protection against external attacks, internal network protection, traffic monitoring, email filtering, Web filtering, application layer filtering
- ASPF
- Multiple types of VPN services, such as L2TP VPN, GRE VPN, IPsec VPN, and dynamic VPN
- RIP/OSPF/BGP routing, routing policy, and policy-based routing
- Power module 1+1 redundancy backup (AC+AC or DC+DC)
- Multiple types of service interface modules
- High availability functions, such as stateful failover and VRRP

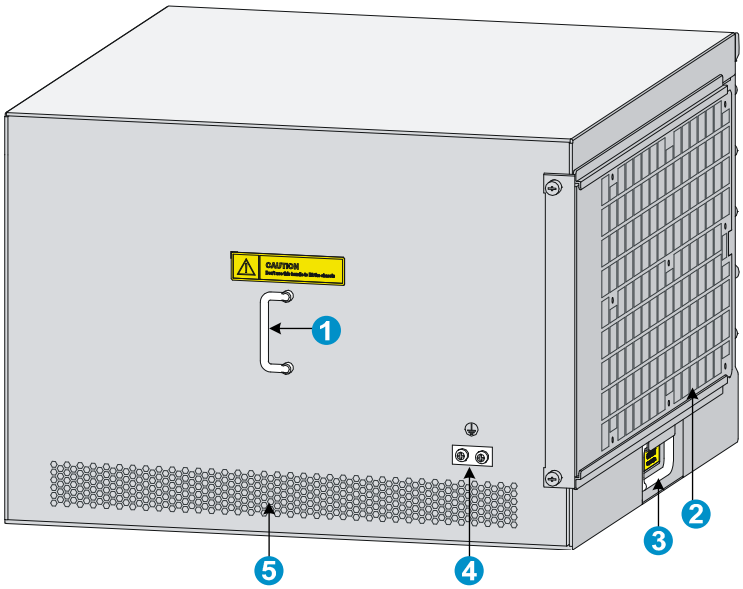
Appearance

Figure 5 Front view



1: MPU slot (Slot 0)	2: Fan tray slot
3: Power module slot 1 (PWR1)	4: PoE power module filler panel (reserved for future PoE support)
5: Power module slot 2 (PWR2)	6: Grounding screw and sign
7: Interface module slots (Slot 1 through Slot 4)	

Figure 6 Rear view



1: Rear chassis cover handle (do not use this handle to lift the chassis)	2: (Optional) Air filter
3: Chassis handle	4: Grounding screw and sign
5: Air vents	

Firewall modules

Overview

The firewall modules are developed based on the Open Application Architecture (OAA) for carrier-level customers.

A firewall module can be installed in the HP 5800/7500E/9500E/12500 Switch or a 6600/8800 router. A switch or router can be installed with multiple firewall modules to expand the firewall processing capability for future use. The main network device (switch or router) and the firewall modules together provide highly integrated network and security functions for large networks.

The firewall modules support the following functions and features:

- Traditional firewall functions
- Virtual firewall, security zone, attack protection, URL filtering
- Application Specific Packet Filter (ASPF), which can monitor connection processes and user operations and provide dynamic packet filtering together with ACLs.
- Multiple types of VPN services, such as IPsec VPN
- RIP/OSPF/BGP routing

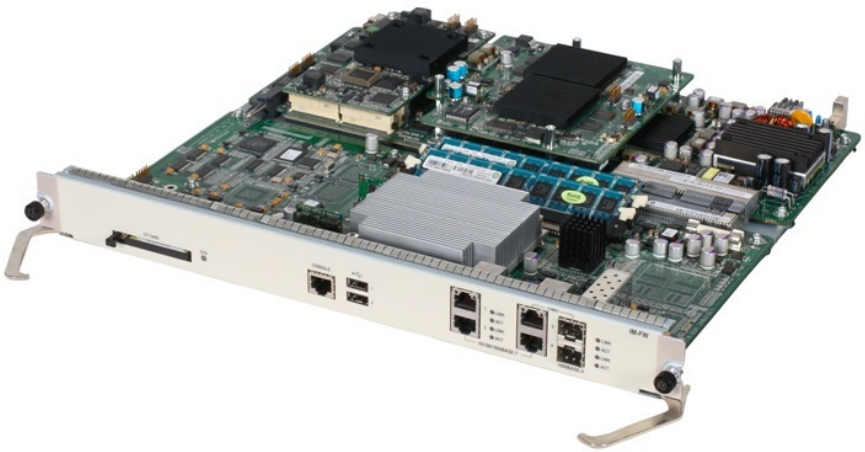
A firewall module provides two GE ports and two GE combo interfaces, which can be used as management ports and stateful failover ports. It is connected to the main network device through the internal 10GE port. The HP main network device's rear card has the line-speed forwarding capability, ensuring fast data forwarding with the firewall module. The firewall modules are equipped with dedicated, multi-core processors and high-speed caches. They can process security services without impacting performances of the main network devices.

Appearance

Figure 7 Firewall module for 5800 switches

Figure 8 Firewall module for 7500E/9500E/12500 switches

Figure 9 Firewall module for 6600/8800 routers



Enhanced firewall modules

The Enhanced firewall module is a new-generation firewall module developed based on the 40G hardware platform to meet the security-network integration trend and satisfy the ultra-10G Ethernet bandwidth requirements. It is the first model of ultra-10G firewall module in the industry and can be used in HP 10500/12500 Ethernet switches. Using the Enhanced firewall module, you can implement security functions (such as firewall and VPN) in the HP 10500/12500 switches, integrating security protection with network functions.

The Enhanced firewall module supports the following functions:

- External attack protection, internal network protection, traffic monitoring, URL filtering, application layer filtering.
- ASPF
- Email alarm, attack log, stream log, and network management monitoring.
- Stateful failover (Active/Active and Active/Standby mode), implementing load sharing and service backup.

UTM products

Overview

The HP UTM products are a new generation of professional security devices developed by HP for enterprises. They fall into the following categories:

- U200-A: For small- to medium-sized enterprises and branches.
- U200-S: For small enterprises and branches.

The UTM products are based on a high-performance multi-core and multi-thread security platform, and deliver the most comprehensive suite of firewall and virtual private network (VPN) features in the industry:

- Support for security zones, static and dynamic blacklist functions, MAC address–IP address binding, and security zone-based access control and attack protection that can defend against attacks such as ARP spoofing, attacks exploiting TCP flag bits, large ICMP packet attacks, SYN flood attacks, and address scanning and port scanning. These products also provide the stateful application specific packet filter (ASPF) feature, which can monitor the connection setup process, detect invalid operations, and cooperate with ACLs to complete packet filtering.
- Support for various VPN solutions, such as IP security (IPsec) VPN, Layer 2 Tunneling Protocol (L2TP) VPN and Generic Routing Encapsulation (GRE) VPN. You can use these functions to construct various VPNs.
- Support for static routing, policy-based routing, and dynamic routing such as Routing Information Protocol (RIP) and Open Shortest Path First (OSPF).
- Support for virtual firewalls, which can effectively save the deployment cost.

The new-generation firewalls not only provide powerful firewall functions, but also support advanced functions that can help achieve higher network security, which include intrusion detection and protection, gateway anti-virus, Point-to-point (P2P) traffic control, and universal resource locator (URL) filtering.

The UTM products have the advantages of high reliability and availability. They support stateful failover, sensing of temperature in the chassis, and are available with AC power modules. In addition, they support network management, and provide a Web management interface, fully satisfying requirements for network maintenance, upgrade, and optimization.

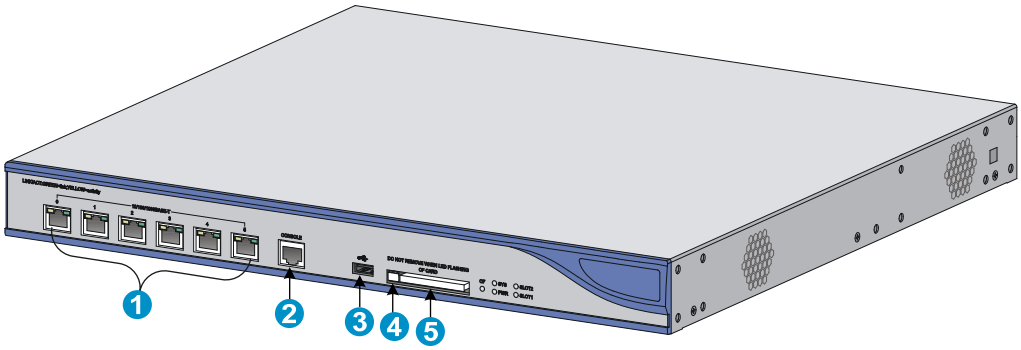
U200-A supports two types of interface modules: NSQ1GT2UA0 and NSQ1GP4U0. Each U200-A provides two MIM expansion slots for future interfacing and service expansion.

U200-S supports one type of interface module: 2GE. Each product provides one interface slot for future interfacing and service expansion.

Appearance

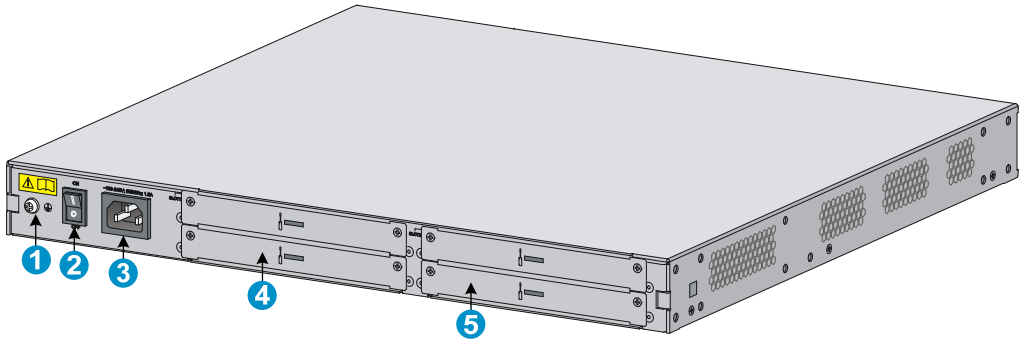
U200-A

Figure 10 U200-A front view



1: Copper Ethernet ports (GE0 to GE5)	2: Console port (CONSOLE)
3: USB port	4: CF ejector button
5: CF card slot	

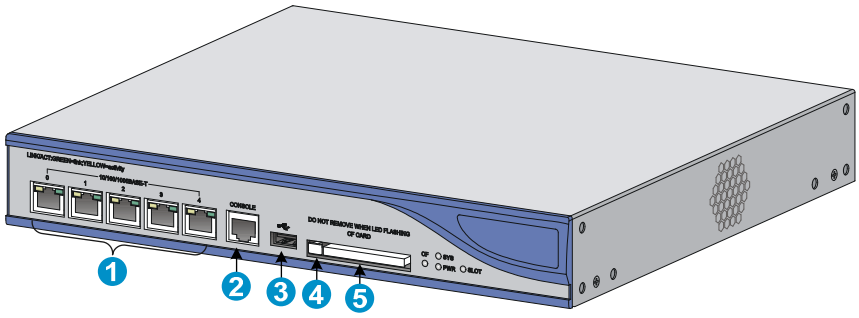
Figure 11 U200-A rear view



1: Grounding screw and sign	2: Power switch (ON/OFF)
3: AC-input power receptacle	4: Interface module slot 1 (SLOT1)
5: Interface module slot 2 (SLOT2)	

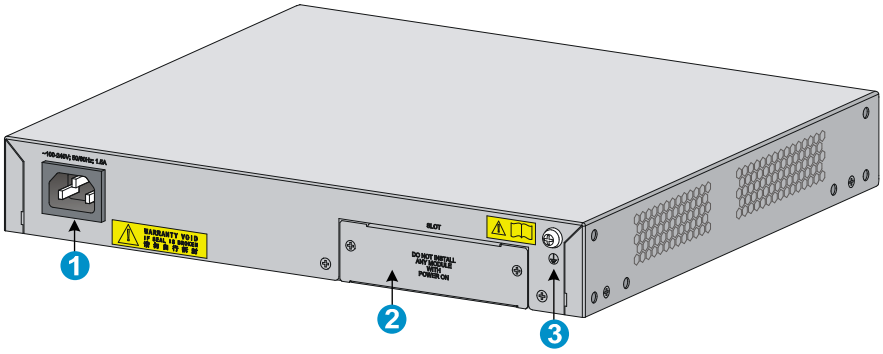
U200-S

Figure 12 U200-S front view



1: Copper Ethernet ports (GE0 to GE4)	2: Console port (CONSOLE)
3: USB port	4: CF ejector button
5: CF card slot	

Figure 13 U200-S rear view



1: AC-input power receptacle	2: Interface module slot (SLOT)
3: Grounding screw and sign	

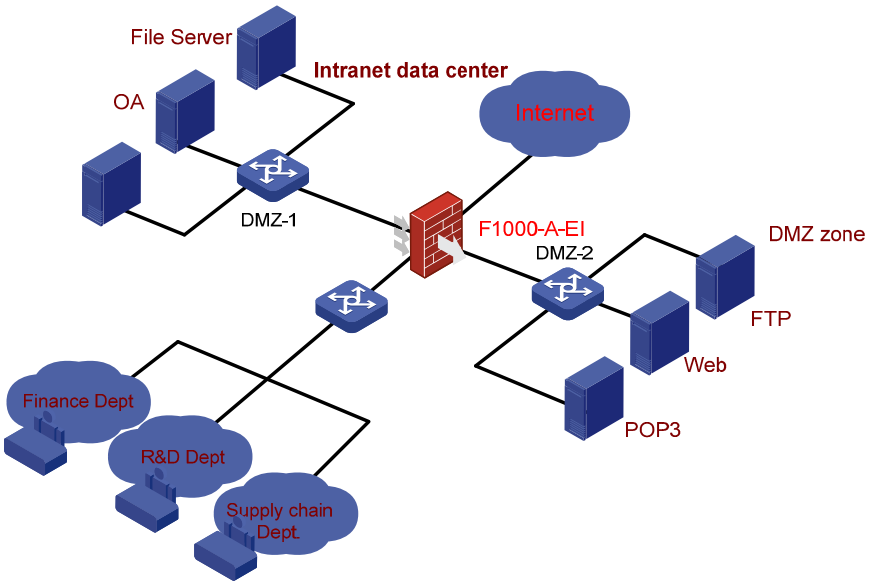
Application scenarios

F1000-A-EI/F1000-S-EI

Firewall application

With powerful filtering and management functions, the F1000-A-EI/F1000-S-EI can be deployed at the egress of an internal network to defend against external attacks and control internal access by separating security zones.

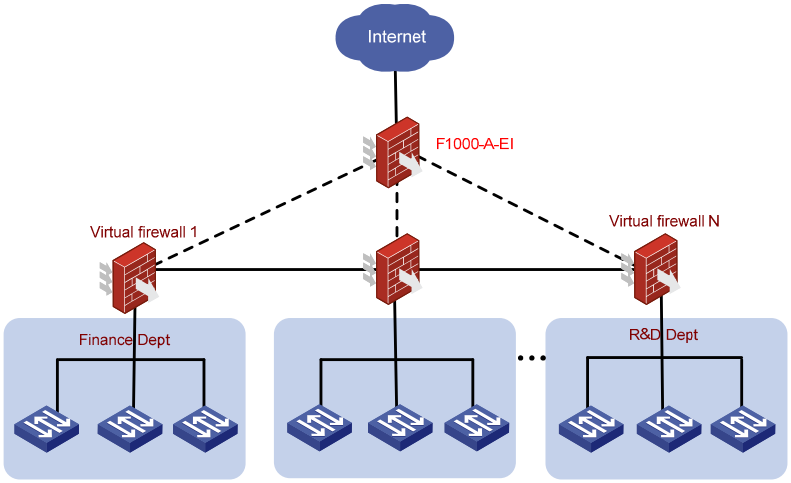
Figure 14 Network diagram



Virtual firewall application

The F1000-A-EI/F1000-S-EI supports the virtual firewall function. You can create multiple virtual firewalls on one firewall. Each virtual firewall can have its own security policy and can be managed independently.

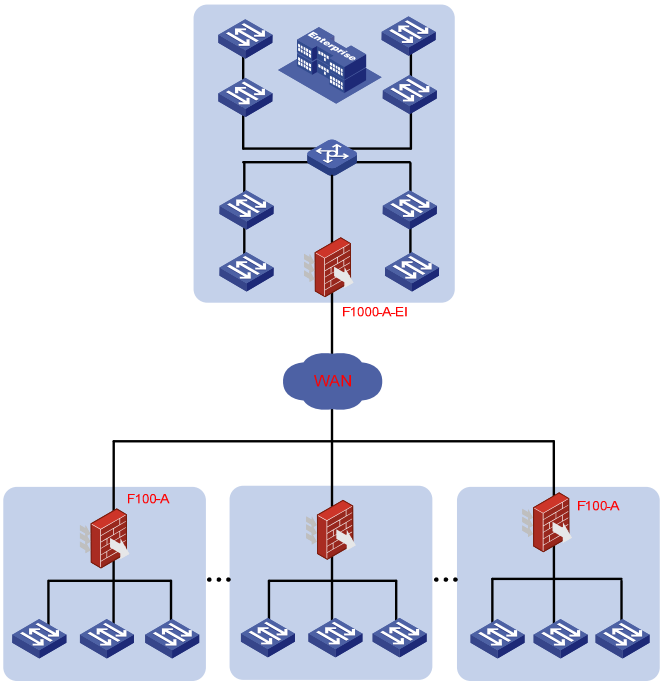
Figure 15 Network diagram



VPN application

The F1000-A-EI/F1000-S-EI supports VPN functions, helping branch offices and remote users securely access the resources in the headquarters and those in their own networks.

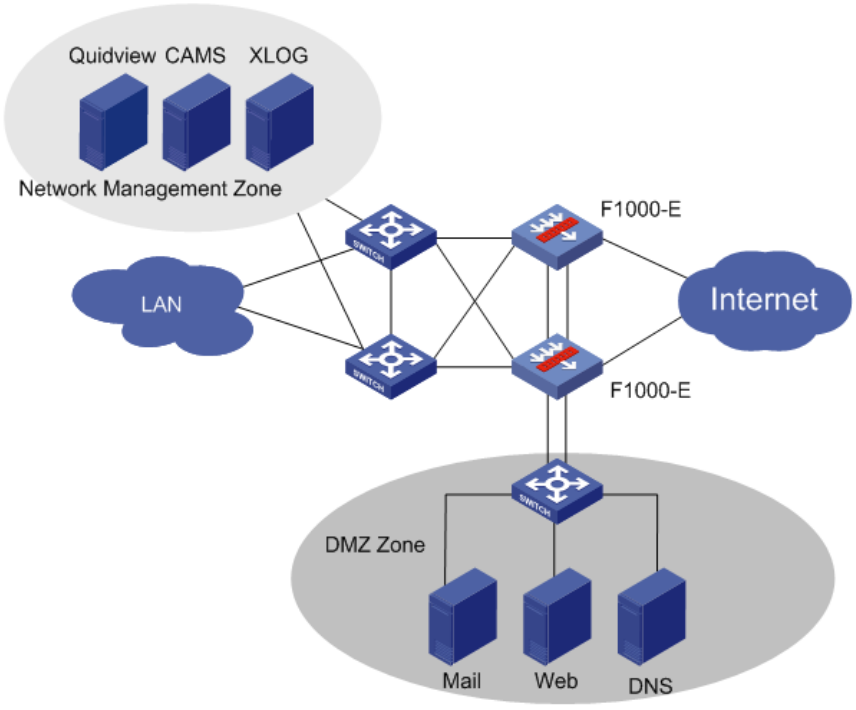
Figure 16 Network diagram



F1000-E

Deployed at the egress of an enterprise network, F1000-E firewalls can protect against external attacks, ensure security access from the external network to the internal network resources (such as servers in the DMZ zone) through NAT and VPN functions, and control access to the internal network by using security zones. You can deploy two firewalls in the network for redundancy backup to avoid a single point failure.

Figure 17 Network diagram

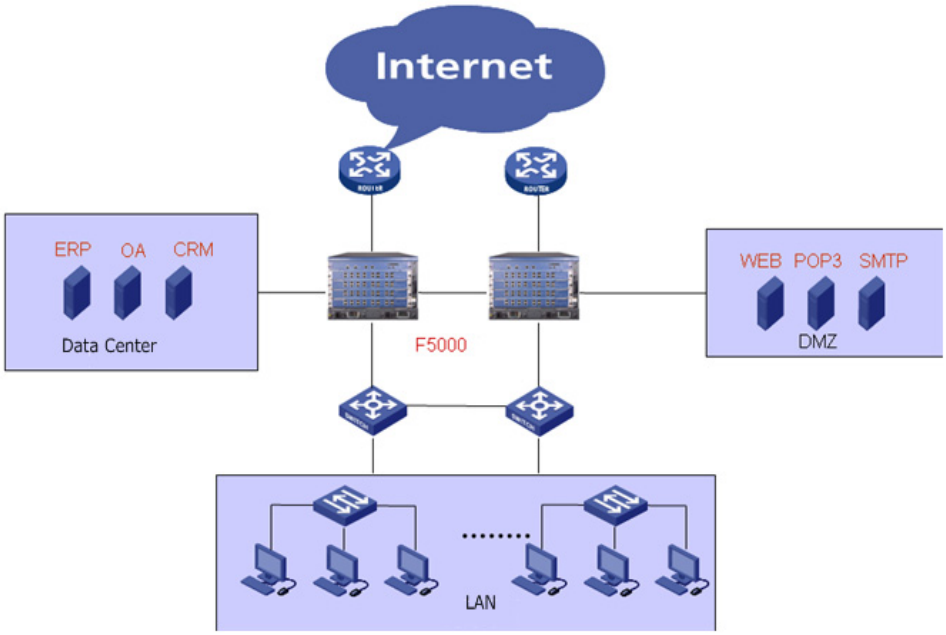


F5000

Large data centers are connected to the 10G core network usually through a 10G Ethernet. The F5000 firewall has a 10G processing capability and abundant port features. It can be deployed at the egress of a network to protect security for the internal network. You can deploy two firewalls to implement stateful failover.

- Active-active stateful failover can balance user data.
- Active-standby stateful failover improves availability of the firewalls. They back up each other to avoid a single point failure.

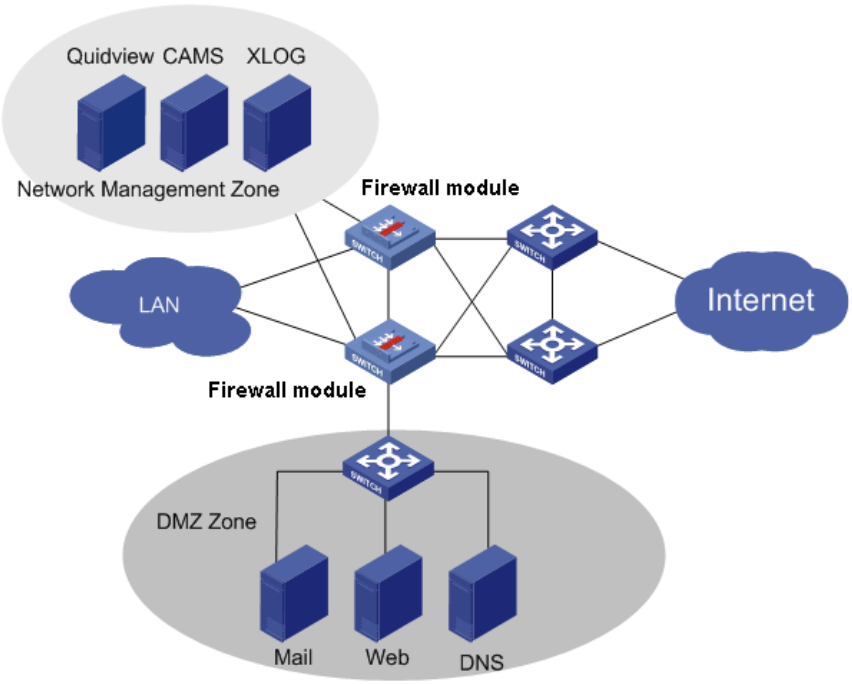
Figure 18 Network diagram



Firewall modules

Firewall modules work with the main network devices (such as 5800/7500/9500/12500 switches and 6600/8800 routers). Deployed at the egress of a network, the firewall modules can protect against external attacks and implement security access control of the internal network by using security zones. You can meet the development of the network simply by installing more firewall modules to a switch or router. Deploying two switches/routers with the firewall modules in the network can improve service availability.

Figure 19 Network diagram

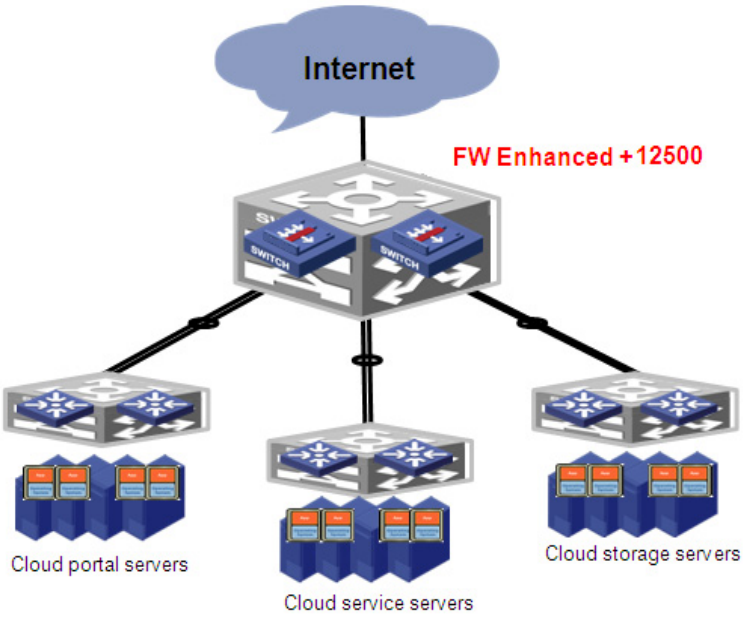


Enhanced firewall modules

Clound computing data center application

The Enhanced firewall modules can provide high-performance firewall functions. They also support the virtual firewall function. An Enhanced firewall module can be virtualized into multiple logical firewalls. Each virtual firewall has its own security policy and is managed independently. The virtual firewall function well satisfies the multi-tenant requirements in cloud computing data centers.

Figure 20 Network diagram

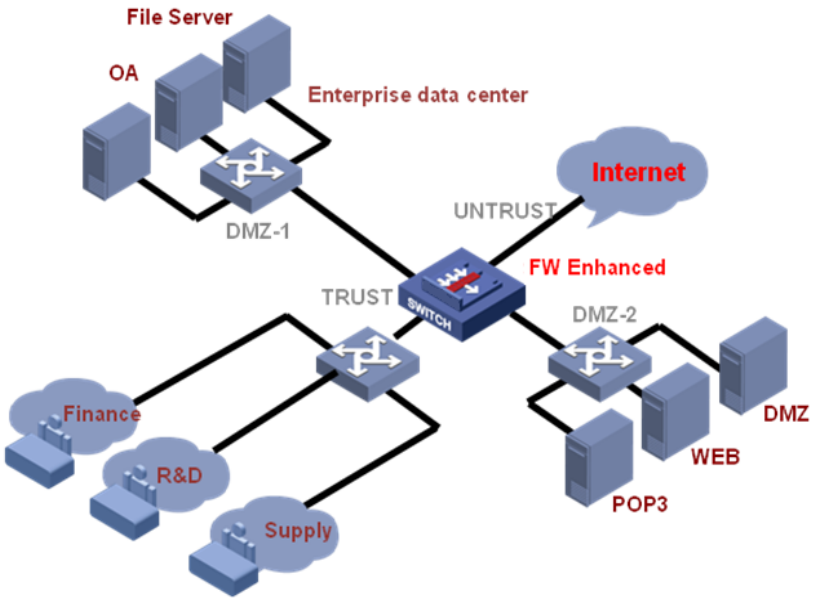


Enterprise network applicatoin

Deployed in the core switch or the aggregation switch of an enterprise network, the Enhanced firewall module provides security isolation and control of the network zones.

Working with the 10500/12500 switch, the Enhanced firewall module can act as the network edge device to protect against external attacks, or as the internal network access control device to isolate different security zones.

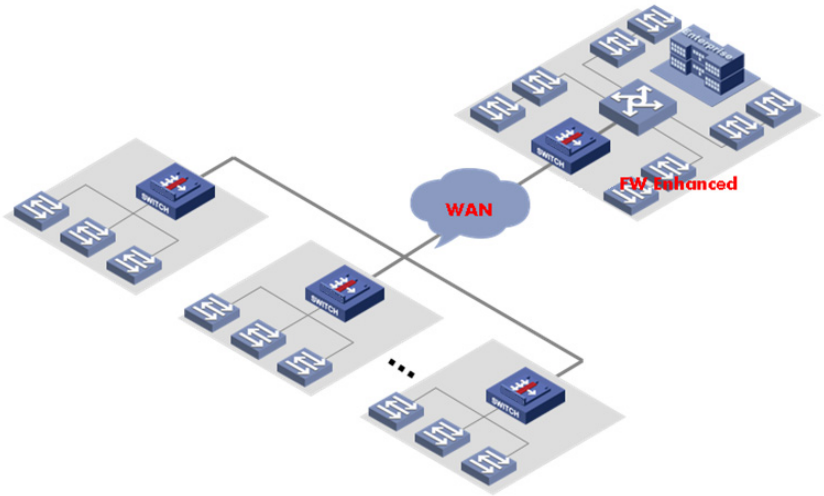
Figure 21 Network diagram



Remote access application

The Enhanced firewall module supports VPN functions, helping branch offices and remote users securely access the resources in the headquarters

Figure 22 Network diagram



UTM

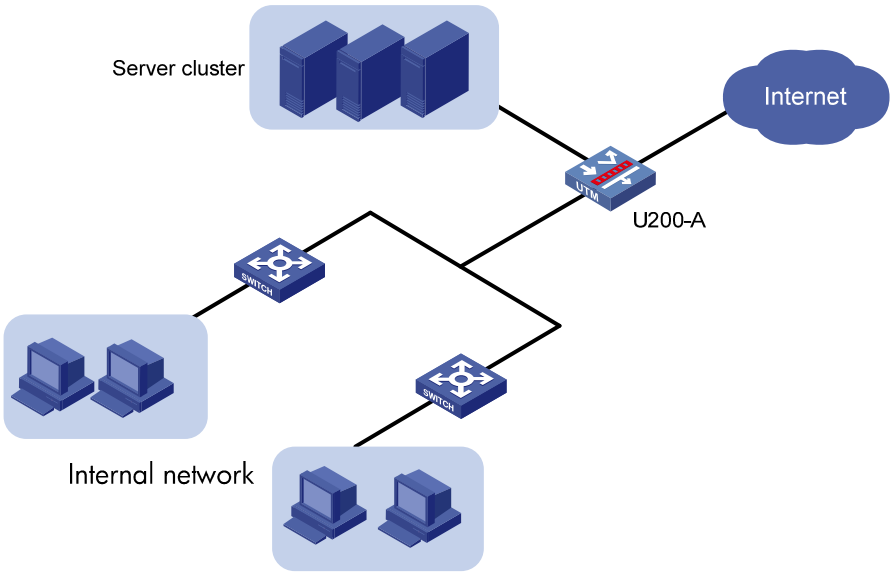
Firewall application

The UTM Security Products can be deployed at the exits of small- to medium-sized enterprise networks to defend against attacks from the Internet. This type of application has the following advantages:

- Integrated security functions that can protect the whole network at application layer.
- Powerful attack protection that can protect the internal servers against various attacks.
- Network Address Translation (NAT) that enables internal users to access the Internet and allows internal servers to provide various services for external users.

Friendly Web interface, which can help reduce the network management and maintenance load.

Figure 23 Network diagram

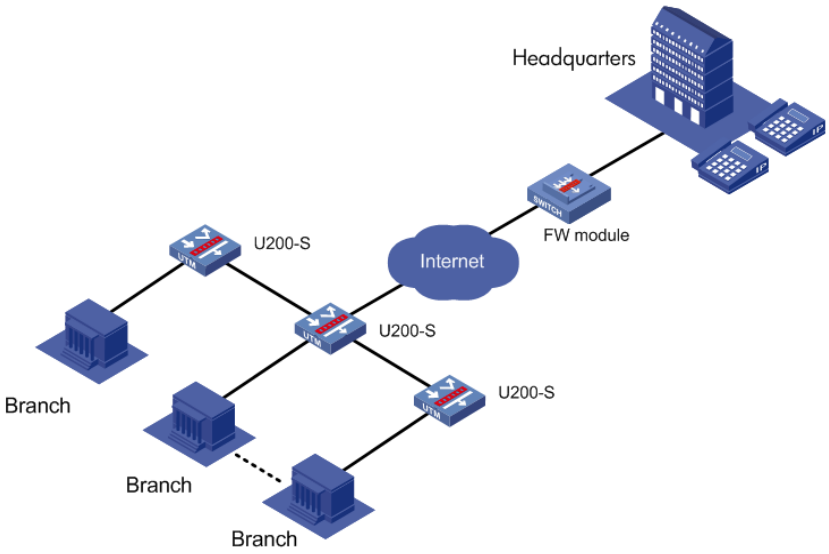


VPN application

The UTM Security Products can be used as the gateways of branches to establish VPN tunnels to the Headquarters. This type of application has the following advantages:

- Supports various NAT and Application Level Gateway (ALG) features, making it easy for users at branches to access the network.
- Supports various VPN gateways, facilitating easy access of mobile users to the network.

Figure 24 Network diagram



Login overview

This chapter describes the available login methods and introduces the related concepts.

Login methods at a glance

You can access the device through the console port or the Web interface at the first login. After login, you can configure other login methods on the device, such as AUX, Telnet, and SSH.

Table 1 Login methods

Login method	Default setting and configuration requirements
Logging in to the CLI:	
• Logging in through the console port for the first time	By default, login through the console port is enabled, no username or password is required, and the user privilege level is 3.
• Logging in through Telnet	By default, Telnet service is disabled. To use Telnet service, you only need to enable the Telnet server function. After you enable the Telnet server function ,a user can log in to the device through Telnet with the IP address 192.168.0.1/24 (the IP address of interface GigabitEthernet 0/0), the username admin, the password admin, and the user privilege level 3.
• Logging in through SSH	By default, SSH service is disabled. To use SSH service, complete the following configuration tasks: • Enable the SSH server function and configure SSH attributes. • Assign an IP address to an interface of the device and make sure the interface and the SSH client can reach each other. By default, only interface GigabitEthernet 0/0 is assigned an IP address (192.168.0.1/24). • Configure scheme authentication for VTY login users (scheme authentication by default). • Configure the user privilege level of VTY login users (0 by default).
Local login through the AUX port	By default, login through the AUX port is disabled. To enable AUX login, log in to the device through the console port, and configure the password for the default password authentication mode, or change the authentication mode and configure parameters for the new authentication mode. NOTE: Support for this login method depends on the device model. For more information, see "Configuring none authentication for AUX login."
Logging in to the Web interface	By default, you can log in to the Web interface of the device with the IP address 192.168.0.1/24 (the IP address of interface GigabitEthernet 0/0), the username admin, and the password admin.

Login method	Default setting and configuration requirements
Accessing the device through SNMP	By default, SNMP login is disabled. To use SNMP service, complete the following configuration tasks: • Assign an IP address to an interface of the device and make sure the interface and the NMS can reach each other. By default, only interface GigabitEthernet 0/0 is assigned an IP address (192.168.0.1/24). • Configure SNMP basic parameters.
Logging in to the firewall module from the network device	After configuring the network device and the firewall module properly, you can log in to the firewall module from the network device.

CLI user interfaces

The device uses user interfaces (also called "lines") to control CLI logins and monitor CLI sessions. You can configure access control settings, including authentication, user privilege, and login redirect on user interfaces. After users are logged in, their actions must be compliant with the settings on the user interfaces assigned to them.

Users are assigned different user interfaces, depending on their login methods, as shown in Table 2.

Table 2 CLI login method and user interface matrix

User interface	Login method
Console user interface	Console port (EIA/TIA-232 DCE)
AUX user interface	AUX port (EIA/TIA-232 DTE, typically used for dial-in access through modems)
Virtual type terminal (VTY) user interface	Telnet or SSH

User interface assignment

The device automatically assigns user interfaces to CLI login users, depending on their login methods. Each user interface can be assigned to only one user at a time. If no user interface is available, a CLI login attempt will be rejected.

For a CLI login, the device always picks the lowest numbered user interface from the idle user interfaces available for the type of login. For example, four VTY user interfaces (0 to 3) are configured, of which VTY 0 and VTY 3 are idle. When a user Telnets to the device, the device assigns VTY 0 to the user and uses the settings on VTY 0 to authenticate and manage the user.

User interface identification

A user interface can be identified by an absolute number, or the interface type and a relative number.

An absolute number uniquely identifies a user interface among all user interfaces. The user interfaces are numbered starting from 0 and incrementing by 1 and in the sequence of console, AUX, and then VTY user interfaces. You can use the **display user-interface** command without any parameters to view supported user interfaces and their absolute numbers.

A relative number uniquely identifies a user interface among all user interfaces that are the same type. The number format is *user interface type* + *number*:

- **Console user interface**—CON0.
- AUX user interface—AUX 0.
- **VTY user interfaces**—Numbered starting from 0 and incrementing by 1.

Logging in to the CLI

By default, the first time you access the CLI you must log in through the console port. At the CLI, you can configure Telnet or SSH for remote access.

Logging in through the console port for the first time

To log in through the console port, make sure the console terminal has a terminal emulation program (for example, HyperTerminal in Windows XP). In addition, the port settings of the terminal emulation program must be the same as the default settings of the console port in Table 3.

Table 3 Default console port properties

Parameter	Default
Bits per second	9600 bps
Flow control	None
Parity	None
Stop bits	1
Data bits	8

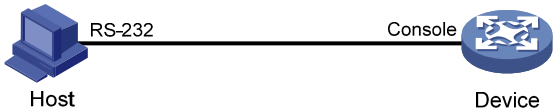
To log in through the console port from a console terminal (for example, a PC):

1. Connect the DB-9 female connector of the console cable to the serial port of the PC.
2. Connect the RJ-45 connector of the console cable to the console port of the device.

IMPORTANT:

- Identify the mark on the console port and make sure you are connecting to the correct port.
- The serial ports on PCs do not support hot swapping. If the device has been powered on, always connect the console cable to the PC before connecting it to the device, and when you disconnect the cable, first disconnect it from the device.

Figure 25 Connecting a terminal to the console port



3. If the PC is off, turn on the PC.
4. Launch the terminal emulation program and configure the communication properties on the PC.

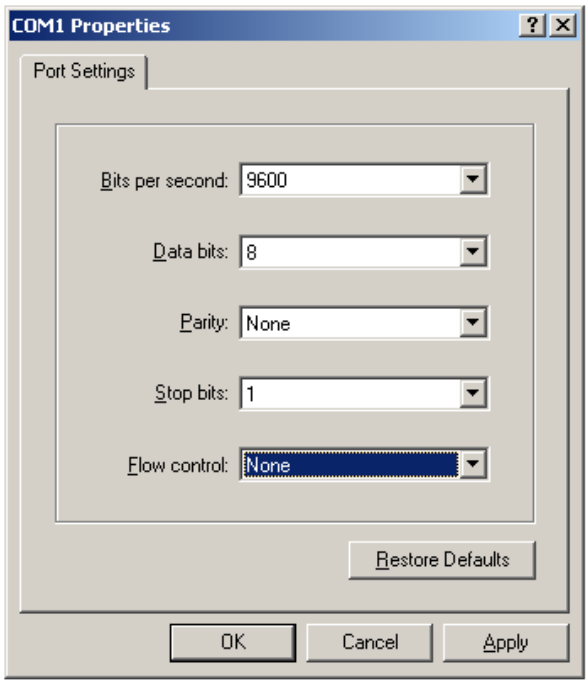
   Figure 26 through Figure 28 show the configuration procedure on Windows XP HyperTerminal. Make sure the port settings are the same as listed in Table 3.

   On Windows Server 2003, add the HyperTerminal program first, and then log in to and manage the device as described in this document. On Windows Server 2008, Windows 7, Windows Vista, or some other operating system, obtain a third-party terminal control program first, and then follow the user guide or online help to log in to the device.

Figure 26 Connection description

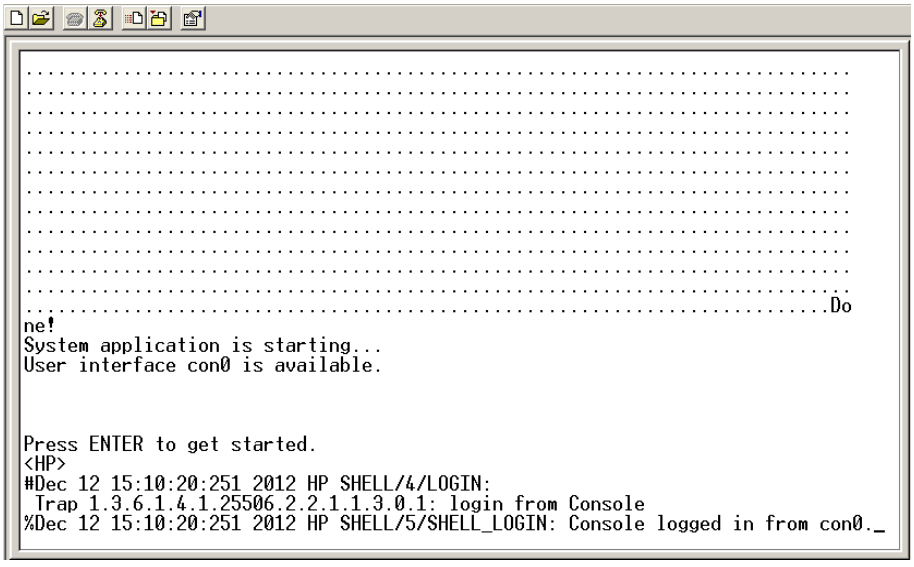
Figure 27 Specifying the serial port used to establish the connection

Figure 28 Setting the properties of the serial port



5. Power on the device and press **Enter** at the prompt.

Figure 29 CLI


Done!
System application is starting...
User interface con0 is available.
Press ENTER to get started.
<HP>
#Dec 12 15:10:20:251 2012 HP SHELL/4/LOGIN:
Trap 1.3.6.1.4.1.25506.2.2.1.1.3.0.1: login from Console
%Dec 12 15:10:20:251 2012 HP SHELL/5/SHELL_LOGIN: Console logged in from con0.

6. At the default user view prompt <HP>, enter commands to configure the device or view the running status of the device. To get help, enter **?**.

Configuring console login control settings

The following authentication modes are available for controlling console logins:

- **None**—Requires no authentication. This mode is insecure.
- **Password**—Requires password authentication.

- **Scheme**—Uses the AAA module to provide local or remote console login authentication. You must provide a username and password for accessing the CLI. For more information about authentication modes and parameters, see *Access Control Configuration Guide*. Keep your username and password.

By default, console login does not require authentication. Any user can log in through the console port without authentication and have user privilege level 3. To improve device security, configure the password or scheme authentication mode immediately after you log in to the device for the first time.

Table 4 Configuration required for different console login authentication modes

Authentication mode	Configuration tasks	Reference
None	Set the authentication mode to **none** for the console user interface.	"Configuring none authentication for console login"
Password	Enable password authentication on the console user interface. Set a password.	"Configuring password authentication for console login"
Scheme	Enable scheme authentication on the console user interface. Configure local or remote authentication settings. To configure local authentication: 1. Configure a local user and specify the password. 2. Configure the device to use local authentication. To configure remote authentication: 3. Configure the RADIUS or HWTACACS scheme on the device. 4. Configure the username and password on the AAA server. 5. Configure the device to use the scheme for user authentication.	"Configuring scheme authentication for console login"

Configuring none authentication for console login

Step	Command	Remarks
6. Enter system view.	**system-view**	N/A
7. Enter console user interface view.	**user-interface console** *first-number* [*last-number*]	N/A
8. Enable none authentication mode.	**authentication-mode none**	By default, you can log in to the device through the console port without authentication and have user privilege level 3.
9. Configure common settings for console login.	See "Configuring common console user interface settings (optional)."	Optional.

The next time you attempt to log in through the console port, you do not need to provide any username or password.

Configuring password authentication for console login

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enter console user interface view.	**user-interface console** *first-number* [*last-number*]	N/A
3.	Enable password authentication.	**authentication-mode password**	By default, you can log in to the device through the console port without authentication and have user privilege level 3 after login.
4.	Set a password.	**set authentication password** { **cipher** | **simple** } *password*	By default, no password is set.
5.	Configure common settings for console login.	See "Configuring common console user interface settings (optional)."	Optional.

The next time you attempt to log in through the console port, you must provide the configured login password.

Configuring scheme authentication for console login

When scheme authentication is used, you can choose to configure the command authorization and command accounting functions.

If command authorization is enabled, a command is available only if the user has the commensurate user privilege level and is authorized to use the command by the AAA scheme.

Command accounting allows the HWTACACS server to record all commands executed by users, regardless of command execution results. This function helps control and monitor user behaviors on the device. If command accounting is enabled and command authorization is not enabled, every executed command is recorded on the HWTACACS server. If both command accounting and command authorization are enabled, only the authorized and executed commands are recorded on the HWTACACS server.

Follow these guidelines when you configure scheme authentication for console login:

- To make the command authorization or command accounting function take effect, apply an HWTACACS scheme to the intended ISP domain. This scheme must specify the IP address of the authorization server and other authorization parameters.
- If the local authentication scheme is used, use the **authorization-attribute level** *level* command in local user view to set the user privilege level on the device.
- If a RADIUS or HWTACACS authentication scheme is used, set the user privilege level on the RADIUS or HWTACACS server.

To configure scheme authentication for console login:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enter console user interface view.	**user-interface console** *first-number* [*last-number*]	N/A

Step	Command	Remarks
3. Enable scheme authentication.	**authentication-mode scheme**	Whether local, RADIUS, or HWTACACS authentication is adopted depends on the configured AAA scheme. By default, console login users are not authenticated.
4. Enable command authorization.	**command authorization**	Optional. By default, command authorization is disabled. The commands available for a user only depend on the user privilege level.
5. Enable command accounting.	**command accounting**	Optional. By default, command accounting is disabled. The accounting server does not record the commands executed by users.
6. Exit to system view.	**quit**	N/A
7. Apply an AAA authentication scheme to the intended domain.	a. Enter ISP domain view: **domain** *domain-name* b. Apply an AAA scheme to the domain: **authentication default** { **hwtacacs-scheme** *hwtacacs-scheme-name* [**local**] | **local** | **none** | **radius-scheme** *radius-scheme-name* [**local**] } c. Exit to system view: **quit**	Optional. By default, local authentication is used. For local authentication, configure local user accounts. For RADIUS or HWTACACS authentication, configure the RADIUS or HWTACACS scheme on the device and configure authentication settings (including the username and password) on the server. For more information about AAA configuration, see *Access Control Configuration Guide*.
8. Create a local user and enter local user view.	**local-user** *user-name*	By default, a local user named admin exists.
9. Set an authentication password for the local user.	**password** { **cipher** | **simple** } *password*	By default, the password for system-predefined user admin is admin, and no password is set for any other local user.
10. Specifies a command level of the local user.	**authorization-attribute level** *level*	Optional. By default, the command level is 0.
11. Specify terminal service for the local user.	**service-type terminal**	By default, the system-predefined user admin can use terminal service, Telnet service, SSH service, and Web service, and no service type is specified for any other local user.
12. Configure common settings for console login.	See "Configuring common console user interface settings (optional)."	Optional.

The next time you attempt to log in through the console port, you must provide the configured login username and password.

Configuring common console user interface settings (optional)

Some common settings configured for a console user interface take effect immediately and can interrupt the console login session. To save you the trouble of repeated re-logins, use a login method different from console login to log in to the device before you change console user interface settings.

After the configuration is complete, change the terminal settings on the configuration terminal and make sure they are the same as the settings on the device.

To configure common settings for a console user interface:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enter console user interface view.	**user-interface console** *first-number* [*last-number*]	N/A
3.	Set the baud rate.	**speed** *speed-value*	By default, the baud rate is 9600 bps.
4.	Specify the parity check mode.	**parity** { **even** | **mark** | **none** | **odd** | **space** }	The default setting is **none**, namely, no parity check.
5.	Specify the number of stop bits.	**stopbits** { **1** | **1.5** | **2** }	The default is 1. Stop bits indicate the end of a character. The more the stop bits, the slower the transmission.
6.	Specify the number of data bits in each character.	**databits** { **5** | **6** | **7** | **8** }	The default is 8. The setting depends on the character coding type. For example, you can set it to 7 if standard ASCII characters are to be sent, and set it to 8 if extended ASCII characters are to be sent.
7.	Define the shortcut key for starting a terminal session.	**activation-key** *character*	By default, you press **Enter** to start the terminal session.
8.	Define a shortcut key for terminating tasks.	**escape-key** { **default** | *character* }	By default, pressing **Ctrl+C** terminates a task.

Step	Command	Remarks
9. Specify the terminal display type.	**terminal type** { **ansi** | **vt100** }	By default, the terminal display type is ANSI. The device supports two types of terminal display: ANSI and VT100. HP recommends setting the display type of both the device and the terminal to VT100. If the device and the client use different display types (for example, HyperTerminal or Telnet terminal) or both are set to ANSI, when the total number of characters of the currently edited command line exceeds 80, an anomaly such as cursor corruption or abnormal display of the terminal display might occur on the client.
10. Configure the user privilege level for login users.	**user privilege level** *level*	By default, the default command level is 3 for the console user interface.
11. Set the maximum number of lines to be displayed on a screen.	**screen-length** *screen-length*	By default, a screen displays 24 lines at most. A value of 0 disables pausing between screens of output.
12. Set the size of command history buffer.	**history-command max-size** *value*	By default, the buffer saves 10 history commands at most.
13. Set the idle-timeout timer.	**idle-timeout** *minutes* [*seconds*]	The default idle-timeout is 10 minutes. The system automatically terminates the user's connection if there is no information interaction between the device and the user within the idle-timeout time. Setting idle-timeout to 0 disables the idle-timeout function.

Logging in through Telnet

NOTE:

Telnet login is not supported in FIPS mode.

You can Telnet to the device for remote management, or use the device as a Telnet client to Telnet to other devices, as shown in Figure 30.

Figure 30 Telnet login

Table 5 shows the Telnet server and client configuration required for a successful Telnet login.

Table 5 Telnet server and Telnet client configuration requirements

Device role	Requirements
Telnet server	Enable Telnet server. Assign an IP address to an interface of the device, and make sure the Telnet server and client can reach each other. By default, only interface GigabitEthernet 0/0 is assigned an IP address (192.168.0.1/24). Configure the authentication mode and other settings.
Telnet client	Run the Telnet client program. Obtain the IP address of the interface on the server.

To control Telnet access to the device operating as a Telnet server, configure login authentication and user privilege levels for Telnet users.

By default, password authentication applies to Telnet login. To allow Telnet access to the device after you enable the Telnet server, you must configure scheme authentication.

The following are authentication modes available for controlling Telnet logins:

- **None**—Requires no authentication and is insecure.
- **Password**—Requires a password for accessing the CLI. If your password was lost, log in to the device through the console port to re-set the password.
- **Scheme**—Uses the AAA module to provide local or remote authentication. You must provide a username and password for accessing the CLI. If the password configured in the local user database was lost, log in to the device through the console port and re-set the password. If the username or password configured on a remote server was lost, contact the server administrator for help.

Table 6 Configuration required for different Telnet login authentication modes

Authentication mode	Configuration tasks	Reference
None	Set the authentication mode to **none** for the VTY user interface.	"Configuring none authentication for Telnet login"
Password	Enable password authentication on the VTY user interface. Set a password.	"Configuring password authentication for Telnet login"

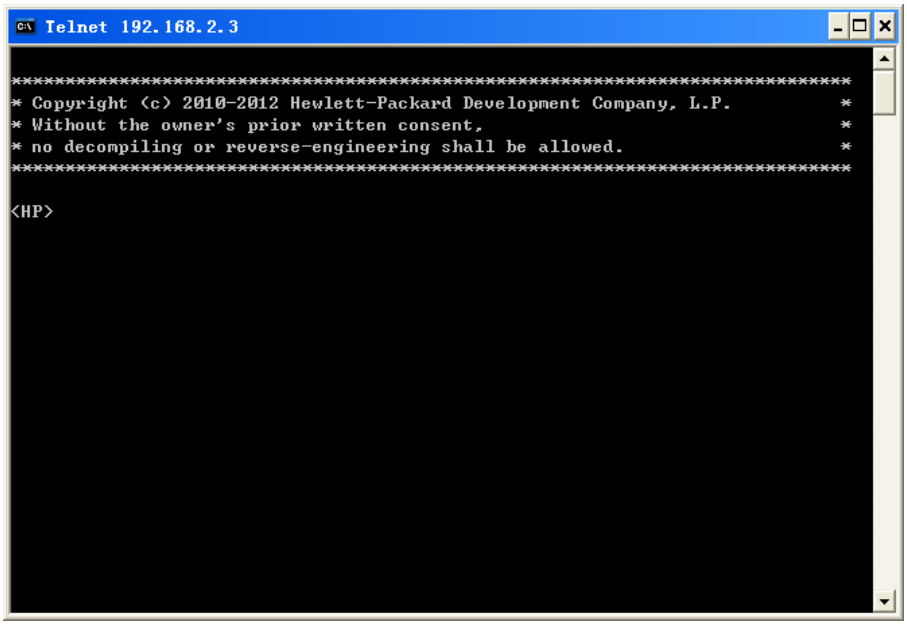
Authentication mode	Configuration tasks	Reference
Scheme	Enable scheme authentication on the VTY user interface. Configure local or remote authentication settings. To configure local authentication: 14. Configure a local user and specify the password. 15. Configure the device to use local authentication. To configure remote authentication: 16. Configure the RADIUS or HWTACACS scheme on the device. 17. Configure the username and password on the AAA server. 18. Configure the device to use the scheme for user authentication.	"Configuring scheme authentication for Telnet login"

Configuring none authentication for Telnet login

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enable Telnet server.	**telnet server enable**	By default, the Telnet server function is disabled.
3.	Enter one or multiple VTY user interface views.	**user-interface vty** *first-number* [*last-number*]	N/A
4.	Enable none authentication mode.	**authentication-mode none**	By default, the authentication mode for VTY user interfaces is scheme.
5.	Configure the command level for login users on the current user interfaces.	**user privilege level** *level*	By default, the default command level is 0 for VTY user interfaces.
6.	Configure common settings for the VTY user interfaces.	See "Configuring common VTY user interface settings (optional)."	Optional.

The next time you attempt to Telnet to the device, you do not need to provide any username or password, as shown in Figure 31. If the maximum number of login users has been reached, your login attempt fails and the message "All user interfaces are used, please try later!" appears.

Figure 31 Telnetting to the device without authentication

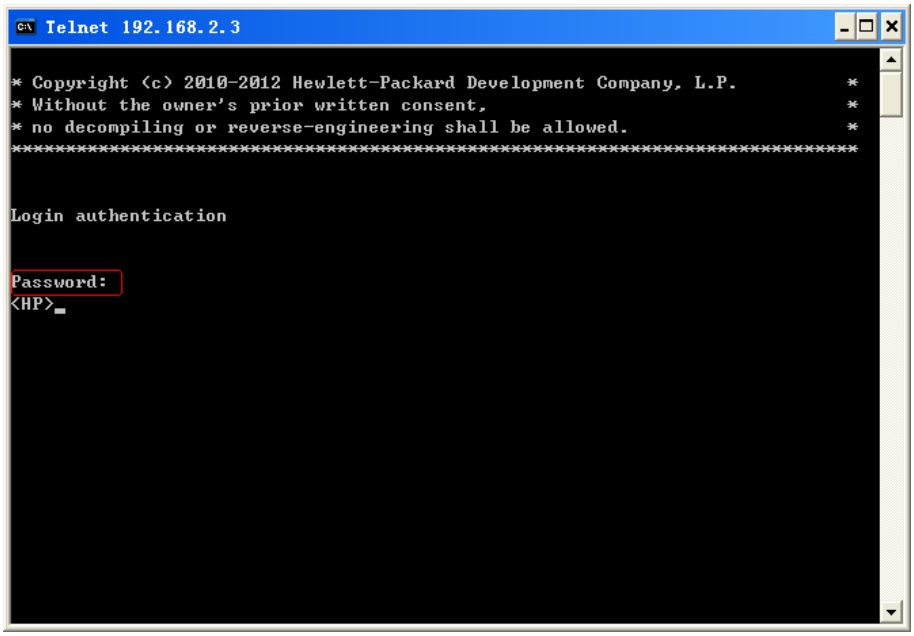

Telnet 192.168.2.3
****
* Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P. *
* Without the owner's prior written consent, *
* no decompiling or reverse-engineering shall be allowed. *
****
<HP>

Configuring password authentication for Telnet login

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enable Telnet server.	**telnet server enable**	By default, the Telnet server function is disabled.
3.	Enter one or multiple VTY user interface views.	**user-interface vty** *first-number* [*last-number*]	N/A
4.	Enable password authentication.	**authentication-mode password**	By default, the authentication mode for the VTY user interfaces is scheme.
5.	Set a password.	**set authentication password** { **cipher** | **simple** } *password*	By default, no password is set.
6.	Configure the user privilege level for login users.	**user privilege level** *level*	The default level is 0.
7.	Configure common settings for VTY user interfaces.	See "Configuring common VTY user interface settings (optional)."	Optional.

The next time you attempt to Telnet to the device, you must provide the configured login password, as shown in Figure 32. If the maximum number of login users has been reached, your login attempt fails and the message "All user interfaces are used, please try later!" appears.

Figure 32 Password authentication interface for Telnet login


Telnet 192.168.2.3
* Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P. *
* Without the owner's prior written consent, *
* no decompiling or reverse-engineering shall be allowed. *
Login authentication
Password:
<HP>

Configuring scheme authentication for Telnet login

When scheme authentication is used, you can choose to configure the command authorization and command accounting functions.

If command authorization is enabled, a command is available only if the user has the commensurate user privilege level and is authorized to use the command by the AAA scheme.

Command accounting allows the HWTACACS server to record all commands executed by users, regardless of command execution results. This function helps control and monitor user behaviors on the device. If command accounting is enabled and command authorization is not enabled, every executed command is recorded on the HWTACACS server. If both command accounting and command authorization are enabled, only the authorized and executed commands are recorded on the HWTACACS server.

Follow these guidelines when you configure scheme authentication for Telnet login:

- To make the command authorization or command accounting function take effect, apply an HWTACACS scheme to the intended ISP domain. This scheme must specify the IP address of the authorization server and other authorization parameters.
- If the local authentication scheme is used, use the **authorization-attribute level** *level* command in local user view to set the user privilege level on the device.
- If a RADIUS or HWTACACS authentication scheme is used, set the user privilege level on the RADIUS or HWTACACS server.

To configure scheme authentication for Telnet login:

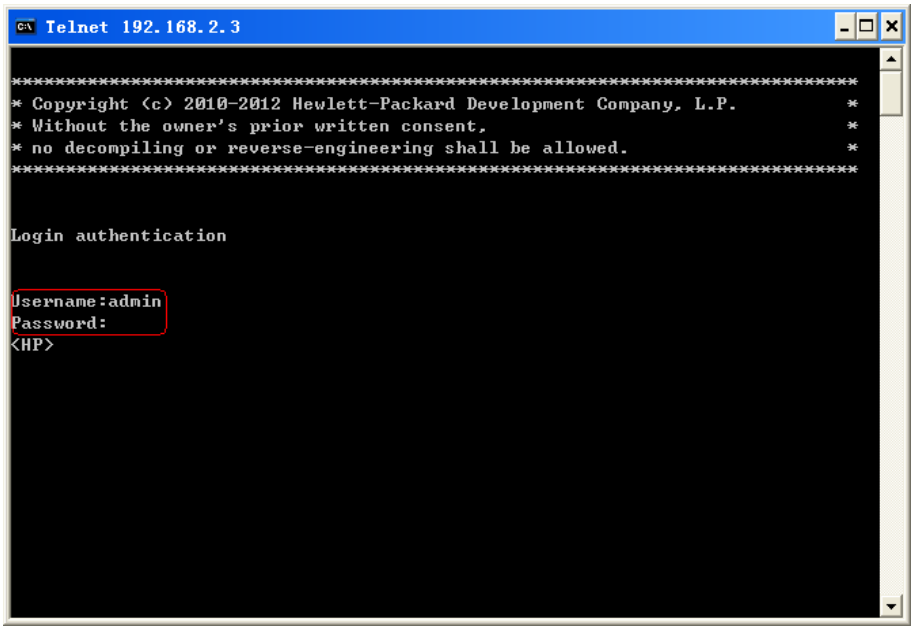
Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enable Telnet server.	**telnet server enable**	By default, the Telnet server function is disabled.

Step	Command	Remarks
3. Enter one or multiple VTY user interface views.	**user-interface vty** *first-number* [*last-number*]	N/A
4. Enable scheme authentication.	**authentication-mode scheme**	Whether local, RADIUS, or HWTACACS authentication is adopted depends on the configured AAA scheme. By default, local authentication is adopted.
5. Enable command authorization.	**command authorization**	Optional. By default, command authorization is disabled. The commands available for a user only depend on the user privilege level.
6. Enable command accounting.	**command accounting**	Optional. By default, command accounting is disabled. The accounting server does not record the commands executed by users.
7. Exit to system view.	**quit**	N/A
8. Apply an AAA authentication scheme to the intended domain.	a. Enter ISP domain view: **domain** *domain-name* b. Apply an AAA scheme to the domain: **authentication default** { **hwtacacs-scheme** *hwtacacs-scheme-name* [**local**] | **local** | **none** | **radius-scheme** *radius-scheme-name* [**local**] } c. Exit to system view: **quit**	Optional. By default, local authentication is used. For local authentication, configure local user accounts. For RADIUS or HWTACACS authentication, configure the RADIUS or HWTACACS scheme on the device and configure authentication settings (including the username and password) on the server. For more information about AAA configuration, see *Access Control Configuration Guide*.
9. Create a local user and enter local user view.	**local-user** *user-name*	By default, a local user named admin exists.
10. Set a password.	**password** { **cipher** | **simple** } *password*	By default, the password for system-predefined user admin is admin, and no password is set for any other local user.
11. Specify the command level of the local user.	**authorization-attribute level** *level*	Optional. By default, the command level is 0.
12. Specify Telnet service for the local user.	**service-type telnet**	By default, the system-predefined user admin can use terminal service, Telnet service, SSH service, and Web service, and no service type is specified for any other local user.
13. Exit to system view.	**quit**	N/A

Step	Command	Remarks
14. Configure common settings for VTY user interfaces.	See "Configuring common VTY user interface settings (optional)."	Optional.

The next time you attempt to Telnet to the CLI, you must provide the configured login username and password, as shown in Figure 33. If you are required to pass a second authentication, you must also provide the correct password to access the CLI. If the maximum number of login users has been reached, your login attempt fails and the message "All user interfaces are used, please try later!" appears.

Figure 33 Scheme authentication interface for Telnet login


Telnet 192.168.2.3
* Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P. *
* Without the owner's prior written consent, *
* no decompiling or reverse-engineering shall be allowed. *
Login authentication
Username:admin
Password:
<HP>

Configuring common VTY user interface settings (optional)

You might be unable to access the CLI through a VTY user interface after configuring the **auto-execute command** command on it. Before you configure the command and save the configuration, make sure you can access the CLI through a different user interface.

To configure common settings for VTY user interfaces:

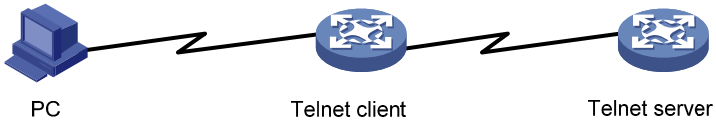
Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter one or multiple VTY user interface views.	**user-interface vty** *first-number* [*last-number*]	N/A
3. Enable the terminal service.	**shell**	Optional. By default, terminal service is enabled.

Step	Command	Remarks
4. Enable the user interfaces to support Telnet, SSH, or both of them.	**protocol inbound** { **all** | **ssh** | **telnet** }	Optional. By default, both Telnet and SSH are supported. The configuration takes effect the next time you log in.
5. Define a shortcut key for terminating tasks.	**escape-key** { **default** | *character* }	Optional. By default, pressing **Ctrl+C** terminates a task.
6. Configure the type of terminal display.	**terminal type** { **ansi** | **vt100** }	Optional. By default, the terminal display type is ANSI.
7. Set the maximum number of lines to be displayed on a screen.	**screen-length** *screen-length*	Optional. By default, up to 24 lines is displayed on a screen. A value of 0 disables the function.
8. Set the size of command history buffer.	**history-command max-size** *value*	Optional. By default, the buffer saves 10 history commands.
9. Set the idle-timeout timer.	**idle-timeout** *minutes* [*seconds*]	Optional. The default idle-timeout is 10 minutes for all user interfaces. The system automatically terminates the user's connection if there is no information interaction between the device and the user within the timeout time. Setting idle-timeout to 0 disables the timer.
10. Specify a command to be automatically executed when a user logs in to the user interfaces.	**auto-execute command** *command*	Optional. By default, no automatically executed command is specified. The command auto-execute function is typically used for redirecting a Telnet user to a specific host. After executing the specified command and performing the incurred task, the system automatically disconnect the Telnet session.

Using the device to log in to a Telnet server

You can use the device as a Telnet client to log in to a Telnet server. If the server is located in a different subnet than the device, make sure the two devices have routes to reach each other.

Figure 34 Telnetting from the device to a Telnet server



To use the device to log in to a Telnet server:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Specify the source IPv4 address or source interface for outgoing Telnet packets.	**telnet client source** { **interface** *interface-type interface-number* | **ip** *ip-address* }	Optional. By default, no source IPv4 address or source interface is specified. The device automatically selects a source IPv4 address.
3. Exit to user view.	**quit**	N/A
4. Use the device to log in to a Telnet server.	• Log in to an IPv4 Telnet server: **telnet** *remote-host* [*service-port*] [**vpn-instance** *vpn-instance-name*] [**source** { **interface** *interface-type interface-number* | **ip** *ip-address* }] • Log in to an IPv6 Telnet server: **telnet ipv6** *remote-host* [**-i** *interface-type interface-number*] [*port-number*] [**vpn-instance** *vpn-instance-name*]	Use either command. NOTE: Support for the **telnet ipv6** command depends on the device model. For more information, see *Getting Started Command Reference*.

Logging in through SSH

SSH offers a secure approach to remote login. By providing encryption and strong authentication, it protects devices against attacks such as IP spoofing and plain text password interception. You can use an SSH client to log in to the device operating as an SSH server for remote management, as shown in Figure 35. You can also use the device as an SSH client to log in to an SSH server.

Figure 35 SSH login diagram

Table 7 shows the SSH server and client configuration required for a successful SSH login.

Table 7 SSH server and client requirements

Device role	Requirements
SSH server	Assign an IP address to an interface of the device, and make sure the interface and the client can reach each other. By default, only interface GigabitEthernet 0/0 is assigned an IP address (192.168.0.1/24). Configure the authentication mode and other settings.
SSH client	If a host operates as an SSH client, run the SSH client program on the host. Obtain the IP address of the interface on the server.

To control SSH access to the device operating as an SSH server, configure authentication and user privilege level for SSH users. By default, password authentication is adopted for SSH login, but no login password is configured. To allow SSH access to the device after you enable the SSH server, you must configure a password.

Configuring the SSH server on the device

When scheme authentication is used, you can choose to configure the command authorization and command accounting functions.

If command authorization is enabled, a command is available only if the user has the commensurate user privilege level and is authorized to use the command by the AAA scheme.

Command accounting allows the HWTACACS server to record all commands executed by users, regardless of command execution results. This function helps control and monitor user behaviors on the device. If command accounting is enabled and command authorization is not enabled, every executed command is recorded on the HWTACACS server. If both command accounting and command authorization are enabled, only the authorized and executed commands are recorded on the HWTACACS server.

Follow these guidelines when you configure the SSH server:

- To make the command authorization or command accounting function take effect, apply an HWTACACS scheme to the intended ISP domain. This scheme must specify the IP address of the authorization server and other authorization parameters.
- If the local authentication scheme is used, use the **authorization-attribute level** *level* command in local user view to set the user privilege level on the device.
- If a RADIUS or HWTACACS authentication scheme is used, set the user privilege level on the RADIUS or HWTACACS server.

The SSH client authentication method is password in this configuration procedure. For more information about SSH and publickey authentication, see *System Management and Maintenance Configuration Guide*.

To configure the SSH server on the device:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Create local key pairs.	**public-key local create** { **dsa** | **rsa** }	By default, no local key pairs are created.
3.	Enable SSH server.	**ssh server enable**	By default, SSH server is disabled.

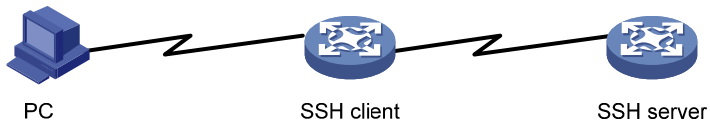
Step	Command	Remarks
4. Enter one or multiple VTY user interface views.	**user-interface vty** *first-number* [*last-number*]	N/A
5. Enable scheme authentication.	**authentication-mode scheme**	By default, the authentication mode for VTY user interfaces is scheme.
6. Enable the user interfaces to support Telnet, SSH, or both of them.	**protocol inbound** { **all** | **ssh** }	Optional. By default, both Telnet and SSH are supported.
7. Enable command authorization.	**command authorization**	Optional. By default, command authorization is disabled. The commands available for a user only depend on the user privilege level.
8. Enable command accounting.	**command accounting**	Optional. By default, command accounting is disabled. The accounting server does not record the commands executed by users.
9. Exit to system view.	**quit**	N/A
10. Apply an AAA authentication scheme to the intended domain.	a. Enter the ISP domain view: **domain** *domain-name* b. Apply the specified AAA scheme to the domain: **authentication default** { **hwtacacs-scheme** *hwtacacs-scheme-name* [**local**] | **ldap-scheme** *ldap-scheme-name* [**local**]| **local** | **none** | **radius-scheme** *radius-scheme-name* [**local**] } c. Exit to system view: **quit**	Optional. For local authentication, configure local user accounts. For RADIUS or HWTACACS authentication, configure the RADIUS or HWTACACS scheme on the device and configure authentication settings (including the username and password) on the server. For more information about AAA configuration, see *Access Control Configuration Guide*.
11. Create a local user and enter local user view.	**local-user** *user-name*	By default, a local user named admin exists.
12. Set a password for the local user.	**password** { **cipher** | **simple** } *password*	By default, the password for system-predefined user admin is admin, and no password is set for any other local user.
13. Specify the command level of the user.	**authorization-attribute level** *level*	Optional. By default, the command level is 0.

Step	Command	Remarks
14. Specify SSH service for the user.	**service-type ssh**	By default, the system-predefined user admin can use terminal service, Telnet service, SSH service, and Web service, and no service type is specified for any other local user.
15. Exit to system view.	**quit**	N/A
16. Create an SSH user, and specify the authentication mode for the SSH user.	**ssh user** *username* **service-type stelnet authentication-type** { **password** | { **any** | **password-publickey** | **publickey** } **assign publickey** *keyname* }	N/A
17. Configure common settings for VTY user interfaces.	See "Configuring common VTY user interface settings (optional)."	Optional.

Using the device to log in to an SSH server

You can use the device as an SSH client to log in to an SSH server. If the server is located in a different subnet than the device, make sure the two devices have routes to reach each other.

Figure 36 Logging in to an SSH client from the device



Perform the following tasks in user view:

Task	Command	Remarks
Log in to an IPv4 SSH server.	**ssh2** *server*	The *server* argument represents the IPv4 address or host name of the server.
Log in to an IPv6 SSH server.	**ssh2 ipv6** *server*	The *server* argument represents the IPv6 address or host name of the server. NOTE: Support for the **ssh2 ipv6** command depends on the device model. For more information, see *Getting Started Command Reference*.

To work with the SSH server, you might need to configure the SSH client. For information about configuring the SSH client, see *Access Control Configuration Guide*.

Local login through the AUX port

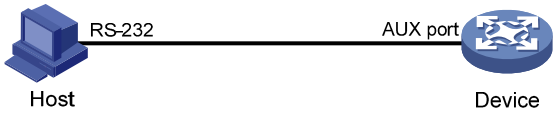
The following matrix shows the feature and hardware compatibility:

Hardware	Feature compatible
F1000-A-EI/F1000-S-EI	No

Hardware	Feature compatible
F1000-E	Yes
F5000	Yes
Firewall module	No
U200-A	No
U200-S	No

As shown in Figure 37, to perform local login through the AUX port, use the same cable and login procedures as console login. For a device with separate console and AUX ports, you can use both ports to log in to the device.

Figure 37 AUX login diagram



To control AUX logins, configure authentication and user privilege for AUX port users.

By default, password authentication applies to AUX login, but no login password is configured. To allow AUX login, you must configure a password.

The following are authentication modes available for controlling AUX logins:

- **None**—Requires no authentication and is insecure.
- **Password**—Requires a password for accessing the CLI.
- **Scheme**—Uses the AAA module to provide local or remote authentication. You must provide a username and password for accessing the CLI. If the username or password configured on a remote server was lost, contact the server administrator for help.

Table 8 Configuration required for different AUX login authentication modes

Authentication mode	Configuration tasks	Reference
None	Set the authentication mode to **none** for the AUX user interface.	"Configuring none authentication for AUX login"
Password	Enable password authentication on the AUX user interface. Set a password.	"Configuring password authentication for AUX login."

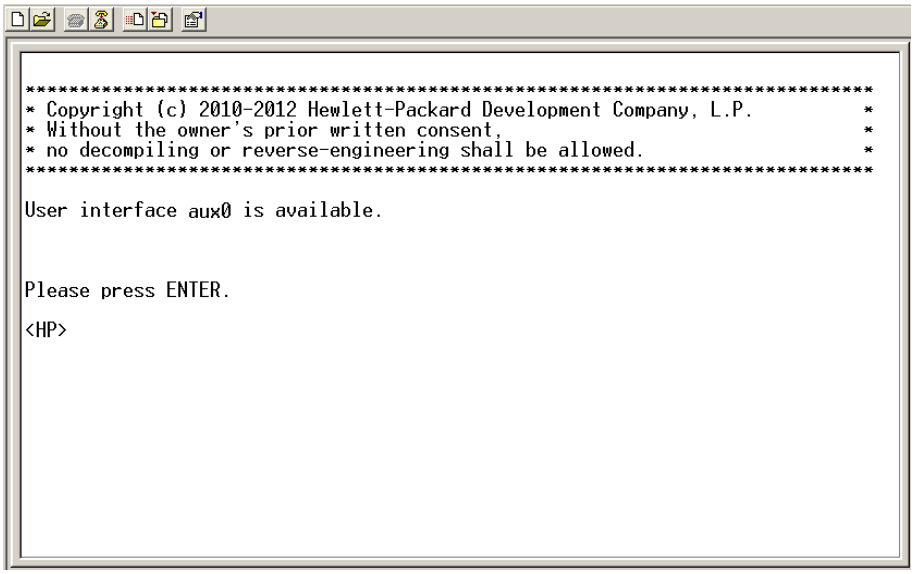
Authentication mode	Configuration tasks	Reference
Scheme	Enable scheme authentication on the AUX user interface. Configure local or remote authentication settings. To configure local authentication: 18. Configure a local user and specify the password. 19. Configure the device to use local authentication. To configure remote authentication: 20. Configure the RADIUS or HWTACACS scheme on the device. 21. Configure the username and password on the AAA server. 22. Configure the device to use the scheme for user authentication.	"Configuring scheme authentication for AUX login."

Configuring none authentication for AUX login

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter one or more AUX user interface view.	**user-interface aux** *first-number* [*last-number*]	N/A
3. Enable none authentication mode.	**authentication-mode none**	By default, password authentication is enabled for AUX login users.
4. Configure common settings for AUX login.	See "Configuring common settings for AUX login (optional)."	Optional.

The next time you attempt to log in through the AUX port, you do not need to provide any username or password, as shown in Figure 38.

Figure 38 Accessing the CLI through the AUX port without authentication

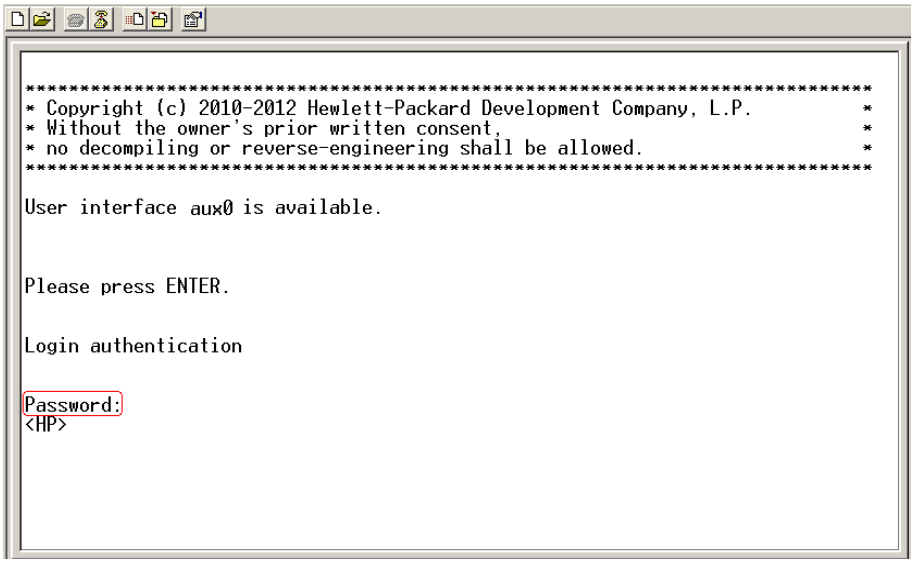

****
* Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P. *
* Without the owner's prior written consent, *
* no decompiling or reverse-engineering shall be allowed. *
****
User interface aux0 is available.
Please press ENTER.
<HP>

Configuring password authentication for AUX login

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enter one or more AUX user interface views.	**user-interface aux** *first-number* [*last-number*]	N/A
3.	Enable password authentication.	**authentication-mode password**	By default, password authentication is enabled but no password is configured. To access the device through the AUX port, you must configure a password for authentication.
4.	Set a password.	**set authentication password** { **cipher** | **simple** } *password*	By default, no password is set.
5.	Configure common settings for AUX login.	See "Configuring common settings for AUX login (optional)."	Optional.

The next time you attempt to log in to CLI through the AUX port, you must provide the configured login password, as shown in Figure 39.

Figure 39 Password authentication interface for AUX login


****
* Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P.
* Without the owner's prior written consent,
* no decompiling or reverse-engineering shall be allowed.
****
User interface aux0 is available.
Please press ENTER.
Login authentication
Password:
<HP>

Configuring scheme authentication for AUX login

When scheme authentication is used, you can choose to configure the command authorization and command accounting functions.

If command authorization is enabled, a command is available only if the user has the commensurate user privilege level and is authorized to use the command by the AAA scheme.

Command accounting allows the HWTACACS server to record all commands executed by users, regardless of command execution results. This function helps control and monitor user behaviors on the device. If command accounting is enabled and command authorization is not enabled, every executed command is recorded on the HWTACACS server. If both command accounting and command authorization are enabled, only the authorized and executed commands are recorded on the HWTACACS server.

Follow these guidelines when you configure scheme authentication for AUX login:

- To make the command authorization or command accounting function take effect, apply an HWTACACS scheme to the intended ISP domain. This scheme must specify the IP address of the authorization server and other authorization parameters.
- If the local authentication scheme is used, use the **authorization-attribute level** *level* command in local user view to set the user privilege level on the device.
- If a RADIUS or HWTACACS authentication scheme is used, set the user privilege level on the RADIUS or HWTACACS server.

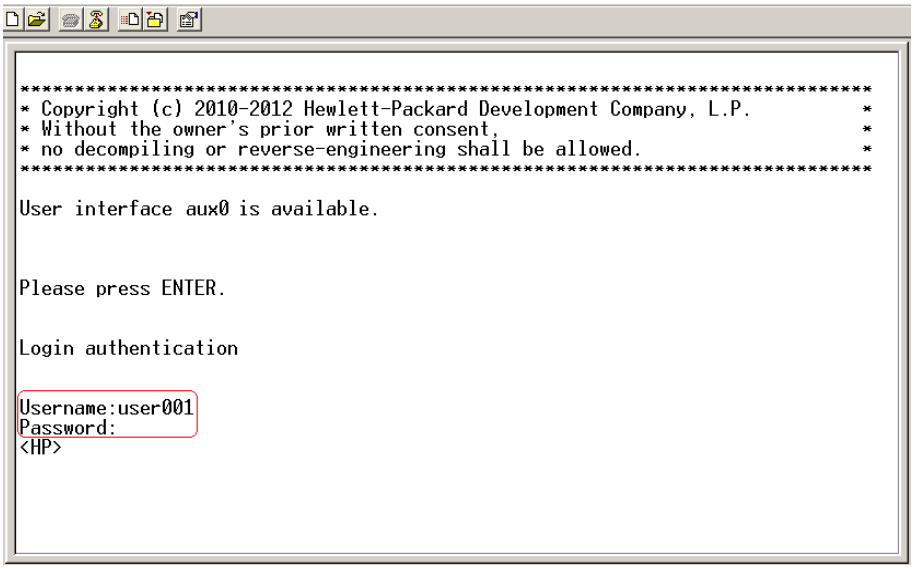
To configure scheme authentication for AUX login:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enter one or more AUX user interface views.	**user-interface aux** *first-number* [*last-number*]	N/A

Step	Command	Remarks
3. Enable scheme authentication.	**authentication-mode scheme**	By default, password authentication is enabled on AUX user interfaces.
4. Enable command authorization.	**command authorization**	Optional. By default, command authorization is disabled. The commands available for a user only depend on the user privilege level.
5. Enable command accounting.	**command accounting**	Optional. By default, command accounting is disabled. The accounting server does not record the commands executed by users.
6. Exit to system view.	**quit**	N/A
7. Apply an AAA authentication scheme to the intended domain.	a. Enter the ISP domain view: **domain** *domain-name* b. Apply the specified AAA scheme to the domain: **authentication default** { **hwtacacs-scheme** *hwtacacs-scheme-name* [**local**] | **local** | **none** | **radius-scheme** *radius-scheme-name* [**local**] } c. Exit to system view: **quit**	Optional. By default, local authentication is used. For local authentication, configure local user accounts. For RADIUS or HWTACACS authentication, configure the RADIUS or HWTACACS scheme on the device and configure authentication settings (including the username and password) on the server. For more information about AAA configuration, see *Access Control Configuration Guide*.
8. Create a local user and enter local user view.	**local-user** *user-name*	By default, no local user exists.
9. Set a password for the local user.	**password** { **cipher** | **simple** } *password*	By default, no password is set.
10. Specifies the command level of the local user.	**authorization-attribute level** *level*	Optional. By default, the command level is 0.
11. Specify terminal service for the local user.	**service-type terminal**	By default, no service type is specified.
12. Configure common AUX user interface settings.	See "Configuring common settings for AUX login (optional)."	Optional.

The next time you attempt to log in through the AUX port, you must provide the configured username and password, as shown in Figure 40.

Figure 40 Scheme authentication interface for AUX login


****
* Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P. *
* Without the owner's prior written consent, *
* no decompiling or reverse-engineering shall be allowed. *
****
User interface aux0 is available.
Please press ENTER.
Login authentication
Username:user001
Password:
<HP>

Configuring common settings for AUX login (optional)

Some common settings configured for an AUX user interface take effect immediately and can interrupt the login session. To save you the trouble of repeated re-logins, use a login method different from AUX login to log in to the device before you change AUX user interface settings.

After the configuration is complete, change the terminal settings on the configuration terminal and make sure they are the same as the settings on the device.

You can connect a device (Device B) to the AUX port of the current device (Device A), and configure the current device to redirect a Telnet login user to that device. If the **redirect enable** and **redirect listen-port** *port-number* commands are configured, a user can use the **telnet** *DeviceA-IP-address port-number* command to log in to Device B. If the **ip alias** *ip-address port-number* command is also configured to associate Device A's IP address with the Telnet redirect listening port, a user can use the **telnet** *DeviceA-IP-address* command to log in to Device B. This Telnet redirect function enables a device to provide Telnet service with its IP address protected.

To configure common settings for AUX user interfaces:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Associate the Telnet redirect listening port with an IP address of the current device.	**ip alias** *ip-address port-number*	By default, a Telnet redirect listening port is not associated with any IP address.
3.	Enter one or more AUX user interface views.	**user-interface aux** *first-number* [*last-number*]	N/A
4.	Set the baud rate.	**speed** *speed-value*	By default, the baud rate is 9600 bps.
5.	Specify the parity check mode.	**parity** { **even** | **mark** | **none** | **odd** | **space** }	The default setting is **none**, namely, no parity check.

Step	Command	Remarks
6. Specify the number of stop bits.	**stopbits** { **1** | **1.5** | **2** }	The default is 1. Stop bits indicate the end of a character. The more the bits, the slower the transmission.
7. Specify the number of data bits in each character.	**databits** { **5** | **6** | **7** | **8** }	By default, the number of data bits in each character is 8. The setting depends on the character coding type. For example, you can set it to 7 if standard ASCII characters are to be sent, and set it to 8 if extended ASCII characters are to be sent.
8. Define a shortcut key for starting a session.	**activation-key** *character*	By default, press **Enter** to start a session.
9. Define a shortcut key for terminating tasks.	**escape-key** { **default** | *character* }	By default, press **Ctrl+C** to terminate a task.
10. Configure the type of terminal display.	**terminal type** { **ansi** | **vt100** }	By default, the terminal display type is ANSI. The device supports two types of terminal display: ANSI and VT100. HP recommends setting the display type of both the device and the client to VT100. If the device and the client use different display types (for example, HyperTerminal or Telnet terminal) or both are set to ANSI, when the total number of characters of the currently edited command line exceeds 80, an anomaly such as cursor corruption or abnormal display of the terminal display might occur on the client.
11. Configure the user privilege level for login users.	**user privilege level** *level*	By default, the default command level is 0 for the AUX user interface.
12. Set the maximum number of lines to be displayed on a screen.	**screen-length** *screen-length*	By default, a screen displays 24 lines at most. A value of 0 disables pausing between screens of output.
13. Set the size of command history buffer.	**history-command max-size** *value*	By default, the buffer saves 10 history commands at most.
14. Set the idle-timeout timer.	**idle-timeout** *minutes* [*seconds*]	The default idle-timeout is 10 minutes. The system automatically terminates the user's connection if there is no information interaction between the device and the user in timeout time. Setting idle-timeout to 0 disables the timer.

The port properties of the terminal emulation program must be the same as the default settings of the AUX port, which are shown in the following table:

Parameter	Default
Bits per second	9600 bps
Flow control	• Independent AUX port: On • Console and AUX integrated port: Off
Parity	None
Stop bits	1
Data bits	8

Login procedure

To log in through the AUX port:

- Complete the authentication settings on the AUX user interface. By default, password authentication is enabled, but no password is set. To use password authentication, you must set a password for password authentication.
- Make sure the configuration terminal has a terminal emulation program (for example, HyperTerminal in Windows XP).
- Port settings of the terminal emulation program must be the same as the settings of the AUX port. Table 9 lists the default AUX port properties.

Table 9 Default AUX port properties

Parameter	Default
Bits per second	9600 bps
Flow control	Off
Parity	None
Stop bits	1
Data bits	8

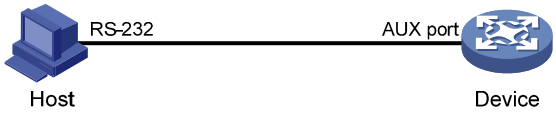
To log in through the AUX port from the configuration terminal (for example, a PC):

1. Plug the DB-9 female connector of the console cable to the serial port of the PC.
2. Plug the RJ-45 connector of the console cable to the AUX port of the device.

IMPORTANT:

- Identify the mark on the console port and make sure you are connecting to the correct port.
- The serial ports on PCs do not support hot swapping. If the switch has been powered on, always connect the console cable to the PC before connecting to the switch, and when you disconnect the cable, first disconnect from the switch.

Figure 41 Connecting the AUX port to a terminal



3. If the PC is off, turn on the PC.
4. Launch the terminal emulation program and configure the communication properties on the PC.

   Figure 42 through Figure 44 show the configuration procedure on Windows XP HyperTerminal.

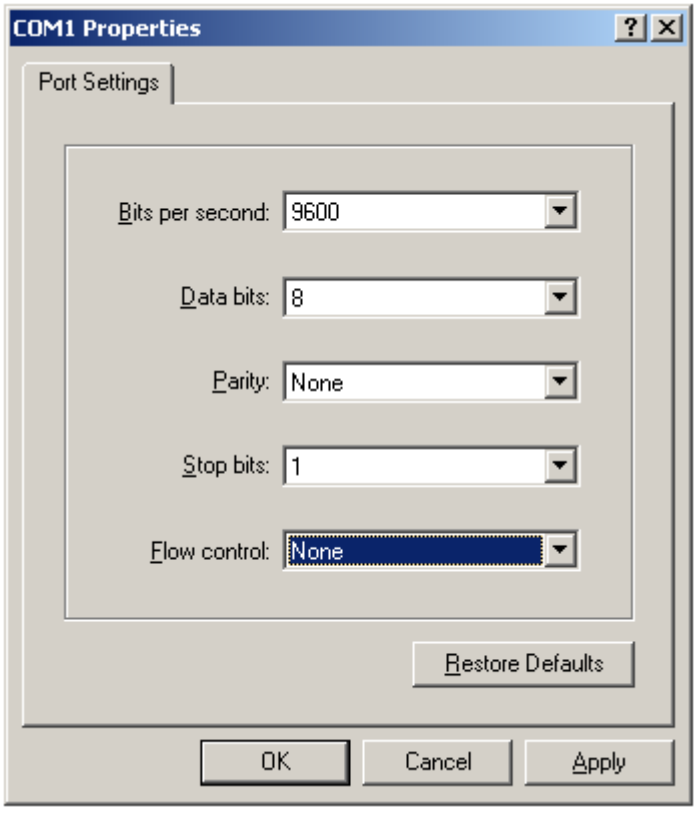
   Make sure the port settings are the same as the common AUX port settings on the device. If the default settings are used, see Table 9.

   On Windows Server 2003, add the HyperTerminal program first, and then log in to and manage the device as described in this document. On Windows Server 2008, Windows 7, Windows Vista, or some other operating system, obtain a third-party terminal control program first, and then follow the user guide or online help of that program to log in to the device.

Figure 42 Connection description

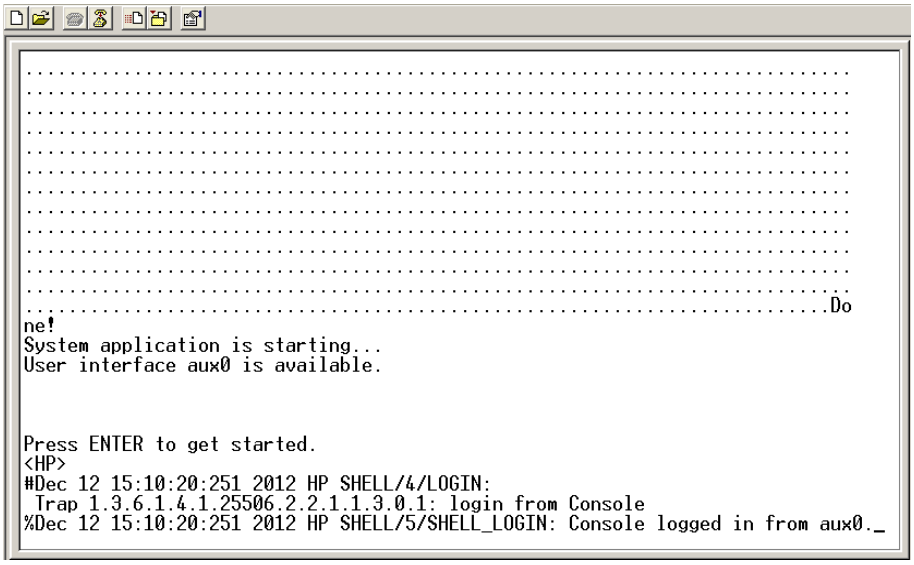
Figure 43 Specifying the serial port used to establish the connection

Figure 44 Setting the properties of the serial port



5. Power on the device and press **Enter** at the prompt.

Figure 45 CLI


Done!
System application is starting...
User interface aux0 is available.
Press ENTER to get started.
<HP>
#Dec 12 15:10:20:251 2012 HP SHELL/4/LOGIN:
Trap 1.3.6.1.4.1.25506.2.2.1.1.3.0.1: login from Console
%Dec 12 15:10:20:251 2012 HP SHELL/5/SHELL_LOGIN: Console logged in from aux0.

6. At the default user view prompt <HP>, enter commands to configure the device or check the running status of the device. To get help, enter **?**.

Displaying and maintaining CLI login

Task	Command	Remarks
Display information about the user interfaces that are being used.	**display users** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display information about all user interfaces the device supports.	**display users all** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display user interface information.	**display user-interface** [*num1* | { **aux** | **console** | **vty** } *num2*] [**summary**] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display the configuration of the device when it serves as a Telnet client.	**display telnet client configuration** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Release a user interface.	**free user-interface** { *num1* | { **aux** | **console** | **vty** } *num2* }	Available in user view. Multiple users can log in to the device to simultaneously configure the device. When necessary, you can execute this command to release some connections. You cannot use this command to release the connection you are using.
Lock the current user interface.	**lock**	Available in user view. By default, the system does not automatically lock a user interface.

Task	Command	Remarks
Send messages to user interfaces.	**send** { **all** | *num1* | { **aux** | **console** | **vty** } *num2* }	Available in user view.

Logging in to the Web interface

The device provides a built-in Web server for you to configure the device through a Web browser. Web login is by default enabled.

Configuration guidelines

- The Web-based configuration interface supports the operating systems of Windows XP, Windows 2000, Windows Server 2003 Enterprise Edition, Windows Server 2003 Standard Edition, Windows Vista, Windows 7, Linux, and MAC OS.
- The Web-based configuration interface supports the browsers of Microsoft Internet Explorer 6.0 SP2 and higher, Mozilla Firefox 3.0 and higher, Google Chrome 2.0.174.0 and higher, and the browser must support and be enabled with JavaScript.
- The Web-based configuration interface does not support the **Back**, **Next**, **Refresh** buttons provided by the browser. Using these buttons may result in abnormal display of Web pages.
- The Windows firewall limits the number of TCP connections, so when you use IE to log in to the Web interface, sometimes you may be unable to open the Web interface. To avoid this problem, HP recommends you to turn off the Windows firewall before login.
- If the software version of the device changes, clear the cache data on the browser before logging in to the device through the Web interface; otherwise, the Web page content may not be displayed correctly.

You can display at most 20,000 entries that support content display by pages.

Logging in by using the default Web login settings

By default, the HTTP service is enabled on the device and you can log in to the Web interface of the device with the following default Web login settings:

- Username **admin**.
- Password **admin**.
- Management interface (GigabitEthernet 0/0) IP address **192.168.0.1**.

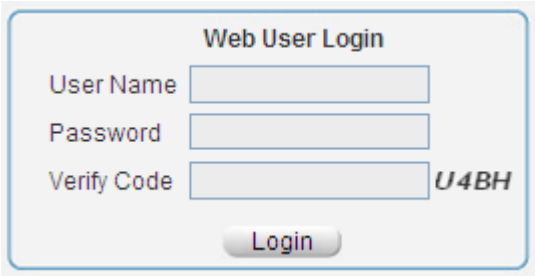
If the HTTP service is disabled, you can enable it by following the steps provided in "Configuring HTTP login."

You can use the default settings to log in to the Web interface by following these steps:

1. Connect a PC to the device's management interface GigabitEthernet 0/0 by using a crossover Ethernet cable.
2. Change the IP address of the PC to one that in the network segment 192.168.0.0/24 (except for 192.168.0.1), for example, 192.168.0.2.
3. Configure routes to make sure the PC and device can communicate with each other properly.
4. Launch a Web browser on the PC, enter the IP address 192.168.0.1 in the address bar, and press **Enter** to open the Web login page.
5. Enter the username, password, and verification code, and click **Login**. To get a new verification code, click the verification code displayed on the Web login page.

Up to five users can concurrently log in to the device through the Web interface.

Figure 46 Web login page



Adding a Web login account

Perform the following configuration at the CLI:

1. Add a Web user. Set the username to **userA**, password to 123456, and user privilege level to 3.

```
[HP] local-user userA
New local user added.
[HP-luser-userA] service-type web
[HP-luser-userA] password simple 123456
[HP-luser-userA] authorization-attribute level 3
[HP-luser-userA] quit
```

2. Add an interface to the management zone.

   To allow users to log in to the device's Web interface through an interface other than the management interface GigabitEthernet 0/0, you must add the interface to the management zone.

```
[HP] zone name management
[HP-zone-management] import interface gigabitethernet0/1
```

Configuring Web login

To enable Web login, log in through the console port, and perform the following configuration tasks:

- Enable HTTP or HTTPS service.
- Configure the IP address of a Layer 3 interface, and make sure the interface and the configuration terminal can reach each other.
- Configure a local user account for Web login.

The device supports HTTP 1.0 and HTTPS for transferring webpage data across the Internet.

HTTPS uses SSL to encrypt data between the client and the server for data integrity and security, and is more secure than HTTP. You can define a certificate attribute-based access control policy to allow only legal clients to access the device.

HTTP login and HTTPS login are separate login methods. To use HTTPS login, you do not need to configure HTTP login.

Table 10 shows the basic Web login configuration requirements.

Table 10 Basic Web login configuration requirements

Object	Requirements
Device	Assign an IP address to an interface. Configure routes to make sure the interface and the PC can reach each other. Perform either or both of the following tasks: • Configuring HTTP login • Configuring HTTPS login
PC	Install a Web browser. Obtain the IP address of the device's interface.

Configuring HTTP login

Step	Command	Remarks
1. Specify a fixed verification code for Web login.	**web captcha** *verification-code*	Optional. By default, a Web user must enter the verification code indicated on the login page to log in. This command is available in user view.
2. Enter system view.	**system-view**	N/A
3. Enable the HTTP service.	**ip http enable**	By default, HTTP service is enabled.
4. Configure the HTTP service port number.	**ip http port** *port-number*	Optional. The default HTTP service port is 80. If you execute the command multiple times, the last one takes effect.
5. Associate the HTTP service with an ACL.	**ip http acl** *acl-number*	Optional. By default, the HTTP service is not associated with any ACL. Associating the HTTP service with an ACL enables the device to allow only clients permitted by the ACL to access the device.
6. Set the Web connection timeout time.	**web idle-timeout** *minutes*	Optional.
7. Set the size of the buffer for Web login logging.	**web logbuffer size** *pieces*	Optional.
8. Create a local user and enter local user view.	**local-user** *user-name*	By default, a local user named admin exists.
9. Configure a password for the local user.	**password** { **cipher** | **simple** } *password*	By default, the password for system-predefined user admin is admin, and no password is set for any other local user.

Step	Command	Remarks
10. Specify the command level of the local user.	**authorization-attribute level** *level*	No command level is configured for the local user.
11. Specify the Telnet service type for the local user.	**service-type web**	By default, the system-predefined user admin can use terminal service, Telnet service, SSH service, and Web service, and no service type is specified for any other local user.
12. Exit to system view.	**quit**	N/A
13. Enter interface view.	**interface** *interface-type interface-number*	N/A
14. Assign an IP address and subnet mask to the interface.	**ip address** *ip-address* { *mask* | *mask-length* }	N/A By default, only interface GigabitEthernet 0/0 is assigned an IP address (192.168.0.1/24).

Configuring HTTPS login

The device supports the following HTTPS login modes:

- **Simplified mode**—To make the device operate in this mode, you only need to enable HTTPS service on the device. The device will use a self-signed certificate (a certificate that is generated and signed by the device itself, rather than a CA) and the default SSL settings. This mode is simple to configure but has potential security risks.
- **Secure mode**—To make the device operate in this mode, you must enable HTTPS service on the device, specify an SSL server policy for the service, and configure PKI domain-related parameters. This mode is more complicated to configure but provides higher security.

For more information about SSL and PKI, see *Network management Configuration Guide* and *VPN Configuration Guide*.

Follow these guidelines when you configure HTTPS login:

- If the HTTPS service and the SSL VPN service use the same port number, they must have the same SSL server policy. Otherwise, only one of the two services can be enabled.
- If the HTTPS service and the SSL VPN service use the same port number and the same SSL server policy, disable the two services before you modify the SSL server policy, and re-enable them after the modification. Otherwise, the SSL server policy does not take effect.

To configure HTTPS login:

Step	Command	Remarks
1. Specify a fixed verification code for Web login.	**web captcha** *verification-code*	Optional. By default, a Web user must enter the verification code indicated on the login page to log in. This command is available in user view.
2. Enter system view.	**system-view**	N/A

Step	Command	Remarks
3. Associate the HTTPS service with an SSL server policy.	**ip https ssl-server-policy** *policy-name*	Optional. By default, the HTTPS service is not associated with any SSL server policy, and the device uses a self-signed certificate for authentication. If you disable the HTTPS service, the system automatically de-associates the HTTPS service from the SSL service policy. Before re-enabling the HTTPS service, associate the HTTPS service with an SSL server policy first. If the HTTPS service has been enabled, any changes to the SSL server policy associated with it do not take effect.
4. Enable the HTTPS service.	**ip https enable**	By default, HTTPS is disabled. Enabling the HTTPS service triggers an SSL handshake negotiation process. During the process, if the local certificate of the device exists, the SSL negotiation succeeds, and the HTTPS service can be started properly. If no local certificate exists, a certificate application process will be triggered by the SSL negotiation. Because the application process takes much time, the SSL negotiation often fails and the HTTPS service cannot be started normally. In that case, execute the **ip https enable** command multiple times to start the HTTPS service.
5. Associate the HTTPS service with a certificate attribute-based access control policy.	**ip https certificate access-control-policy** *policy-name*	Optional. By default, the HTTPS service is not associated with any certificate-based attribute access control policy. Associating the HTTPS service with a certificate-based attribute access control policy enables the device to control the access rights of clients. You must configure the **client-verify enable** command in the associated SSL server policy. If not, no clients can log in to the device. The associated SSL server policy must contain at least one **permit** rule. Otherwise, no clients can log in to the device. For more information about certificate attribute-based access control policies, see *VPN Configuration Guide*.
6. Specify the HTTPS service port number.	**ip https port** *port-number*	Optional. The default HTTPS service port is 443.

Step	Command	Remarks
7. Associate the HTTPS service with an ACL.	**ip https acl** *acl-number*	By default, the HTTPS service is not associated with any ACL. Associating the HTTPS service with an ACL enables the device to allow only clients permitted by the ACL to access the device.
8. Specify the authentication mode for users trying to log in to the device through HTTPS.	**web https-authorization mode** { **auto** | **manual** }	Optional. By default, a user must enter the correct username and password to log in through HTTPS. When the **auto** mode is enabled: • If the user's PKI certificate is correct and not expired, the CN field in the certificate is used as the username to perform AAA authentication. If the authentication succeeds, the user automatically enters the Web interface of the device. • If the user's PKI certificate is correct and not expired, but the AAA authentication fails, the device shows the Web login page. The user can log in to the device after entering correct username and password.
9. Set the Web user connection timeout time.	**web idle-timeout** *minutes*	Optional.
10. Set the size of the buffer for Web login logging.	**web logbuffer size** *pieces*	Optional.
11. Create a local user and enter local user view.	**local-user** *user-name*	By default, a local user named admin exists.
12. Configure a password for the local user.	**password** { **cipher** | **simple** } *password*	By default, the password for system-predefined user admin is admin, and no password is set for any other local user.
13. Specify the command level of the local user.	**authorization-attribute level** *level*	By default, no command level is configured for the local user.
14. Specify the Web service type for the local user.	**service-type web**	By default, the system-predefined user admin can use terminal service, Telnet service, SSH service, and Web service, and no service type is specified for any other local user.
15. Exit to system view.	**quit**	N/A
16. Enter interface view.	**interface** *interface-type interface-number*	N/A
17. Assign an IP address and subnet mask to the interface.	**ip address** *ip-address* { *mask* | *mask-length* }	N/A By default, only interface GigabitEthernet 0/0 is assigned an IP address (192.168.0.1/24).

Displaying and maintaining Web login

Task	Command	Remarks
Display information about Web users.	**display web users** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display HTTP state information.	**display ip http** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display HTTPS state information.	**display ip https** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.

HTTP login configuration example

Network requirements

As shown in Figure 47, configure the firewall to allow the PC to log in over the IP network by using HTTP.

Figure 47 Network diagram

Configuration procedure

1. Configure the firewall:

   # Assign the IP address 192.168.0.58/24 to interface GigabitEthernet 0/0.

   ```
   [Firewall] interface gigabitethernet 0/0
   [Firewall-GigabitEthernet0/0] ip address 192.168.0.58 255.255.255.0
   [Firewall-GigabitEthernet0/0] quit
   ```

   # Add interface GigabitEthernet 0/0 to zone Management. (By default, interface GigabitEthernet 0/0 belongs to zone Management. To use another interface (GigabitEthernet 0/1 in the following example) to log in to the device, perform the following configuration:

   ```
   [Firewall] zone name management
   [Firewall-zone-management] import interface gigabitethernet0/1
   ```

   # Create a local user named **admin** and set the password to **admin**. Authorize the user to use the Web service and set the command level to 3.

   ```
   [Firewall] local-user admin
   [Firewall-luser-admin] service-type web
   [Firewall-luser-admin] authorization-attribute level 3
   [Firewall-luser-admin] password simple admin
   [Sysname-luser-admin] quit
   ```

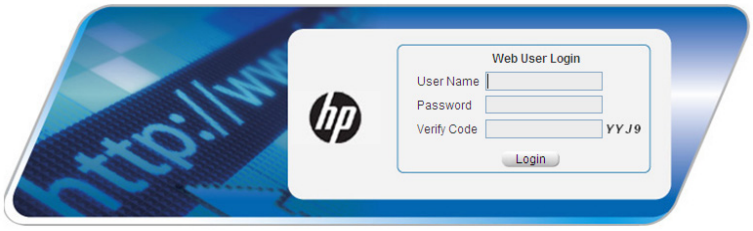
   # Enable the HTTP service. (Optional. Required when the HTTP service is disabled.)

   ```
   [Sysname] ip http enable
   ```

2. Verify the configuration:

   # On the PC, launch a Web browser and enter the IP address of the interface in the address bar. The Web login page appears, as shown in Figure 48.

Figure 48 Web login page



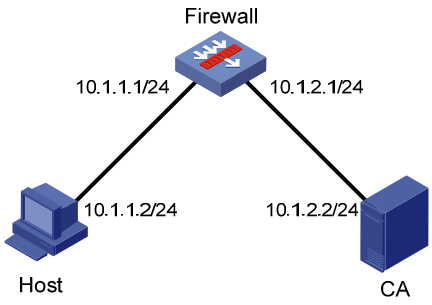
   # Enter the username, password, verification code, and click **Login**. The homepage appears. After login, you can configure device settings through the Web interface.

HTTPS login configuration example

Network requirements

As shown in Figure 49, to prevent unauthorized users from accessing the firewall, configure the firewall as the HTTPS server and the host as the HTTPS client, and request a certificate for each of them.

Figure 49 Network diagram



Configuration procedure

This example assumes that the CA is named **new-ca**, runs Windows Server, and is installed with the SCEP add-on. This example also assumes that the firewall, host, and CA can reach one other.

1. Configure the firewall (HTTPS server):

   # Configure a PKI entity, configure the common name of the entity as **http-server1**, and the FQDN of the entity as **ssl.security.com**.

```
<Firewall> system-view
[Firewall] pki entity en
[Firewall-pki-entity-en] common-name http-server1
[Firewall-pki-entity-en] fqdn ssl.security.com
[Firewall-pki-entity-en] quit
```

Create a PKI domain, specify the trusted CA as **new-ca**, the URL of the server for certificate request as **http://10.1.2.2/certsrv/mscep/mscep.dll**, authority for certificate request as **RA**, and the entity for certificate request as **en**.

```
[Firewall] pki domain 1
[Firewall-pki-domain-1] ca identifier new-ca
[Firewall-pki-domain-1] certificate request url
http://10.1.2.2/certsrv/mscep/mscep.dll
[Firewall-pki-domain-1] certificate request from ra
[Firewall-pki-domain-1] certificate request entity en
[Firewall-pki-domain-1] quit
```

Create RSA local key pairs.

```
[Firewall] public-key local create rsa
```

Retrieve the CA certificate from the certificate issuing server.

```
[Firewall] pki retrieval-certificate ca domain 1
```

Request a local certificate from a CA through SCEP for the firewall.

```
[Firewall] pki request-certificate domain 1
```

Create an SSL server policy **myssl**, specify PKI domain 1 for the SSL server policy, and enable certificate-based SSL client authentication.

```
[Firewall] ssl server-policy myssl
[Firewall-ssl-server-policy-myssl] pki-domain 1
[Firewall-ssl-server-policy-myssl] client-verify enable
[Firewall-ssl-server-policy-myssl] quit
```

Create a certificate attribute group **mygroup1**, and configure a certificate attribute rule, specifying that the distinguished name in the subject name includes the string of **new-ca**.

```
[Firewall] pki certificate attribute-group mygroup1
[Firewall-pki-cert-attribute-group-mygroup1] attribute 1 issuer-name dn ctn new-ca
[Firewall-pki-cert-attribute-group-mygroup1] quit
```

Create a certificate attribute-based access control policy **myacp**. Configure a certificate attribute-based access control rule, specifying that a certificate is considered valid when it matches an attribute rule in certificate attribute group **myacp**.

```
[Firewall] pki certificate access-control-policy myacp
[Firewall-pki-cert-acp-myacp] rule 1 permit mygroup1
[Firewall-pki-cert-acp-myacp] quit
```

Associate the HTTPS service with SSL server policy **myssl**.

```
[Firewall] ip https ssl-server-policy myssl
```

Associate the HTTPS service with certificate attribute-based access control policy **myacp**.

```
[Firewall] ip https certificate access-control-policy myacp
```

Enable the HTTPS service.

```
[Firewall] ip https enable
```

Create a local user named **usera**, set the password to **123**, specify the Web service type, and specify the user privilege level 3. A level-3 user can perform all operations supported by the firewall.

```
[Firewall] local-user usera
[Firewall-luser-usera] password simple 123
[Firewall-luser-usera] service-type web
[Firewall-luser-usera] authorization-attribute level 3
```

2. Configure the host (HTTPS client):

On the host, run the IE browser, and then enter **http://10.1.2.2/certsrv** in the address bar and request a certificate for the host as prompted.

3. Verify the configuration:

   Enter **https://10.1.1.1** in the address bar, and select the certificate issued by **new-ca**. When the Web login page of the firewall appears, enter the username **usera** and password **123** to log in to the Web management page.

For more information about PKI configuration commands, SSL configuration commands, and the **public-key local create rsa** command, see *VPN Command Reference* and *Network Management Command Reference*.

Troubleshooting Web browser

Failure to access the device through the Web interface

Symptom

You can ping the device successfully, and log in to the device through Telnet. HTTP is enabled and the operating system and browser version meet the Web interface requirements. However, you cannot access the Web interface of the device.

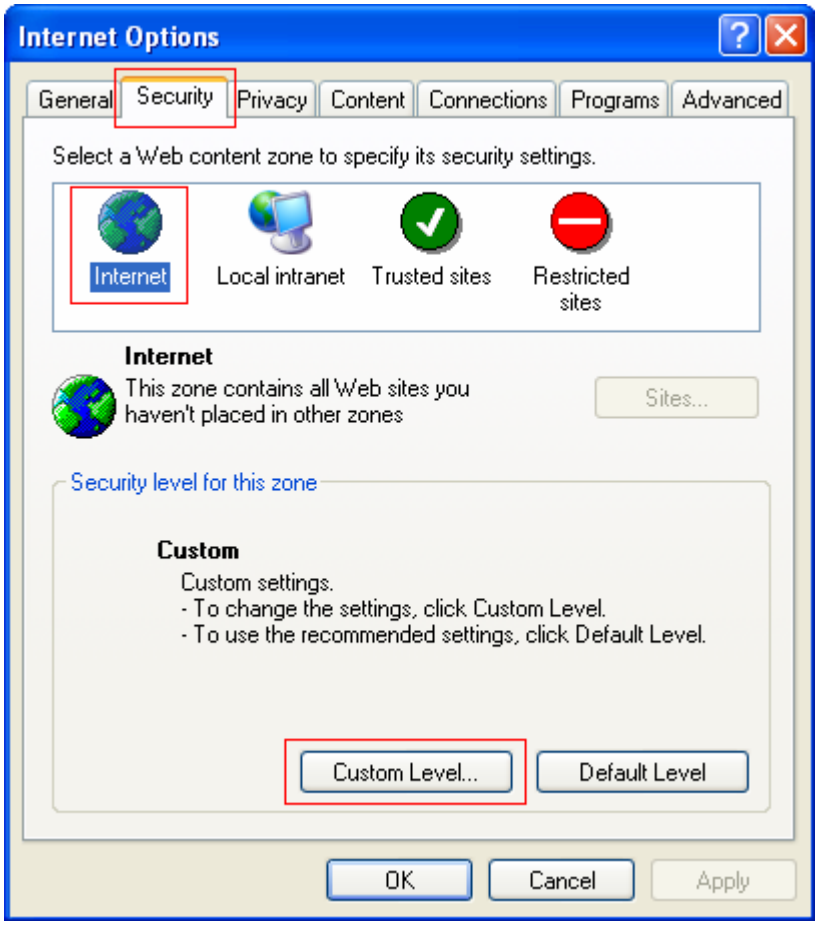
Analysis

- If you use the Microsoft Internet Explorer, you can access the Web interface only when the following functions are enabled: Run ActiveX controls and plug-ins, script ActiveX controls marked safe for scripting and active scripting.
- If you use the Mozilla Firefox, you can access the Web interface only when JavaScript is enabled.

Configuring the Internet Explorer settings

1. Open the Internet Explorer, and select **Tools** > **Internet Options**.
2. Click the **Security** tab, and then select a Web content zone to specify its security settings.

Figure 50 Internet Explorer setting (I)

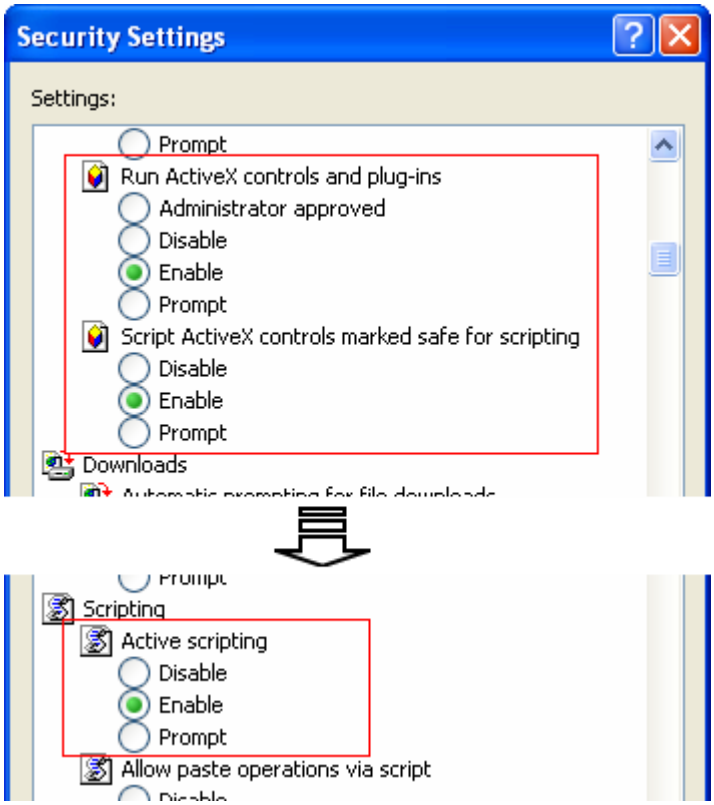


3. Click **Custom Level**.

   The dialog box **Security Settings** appears.

4. Enable Run ActiveX controls and plug-ins, script ActiveX controls marked safe for scripting and active scripting.

Figure 51 Internet Explorer setting (II)

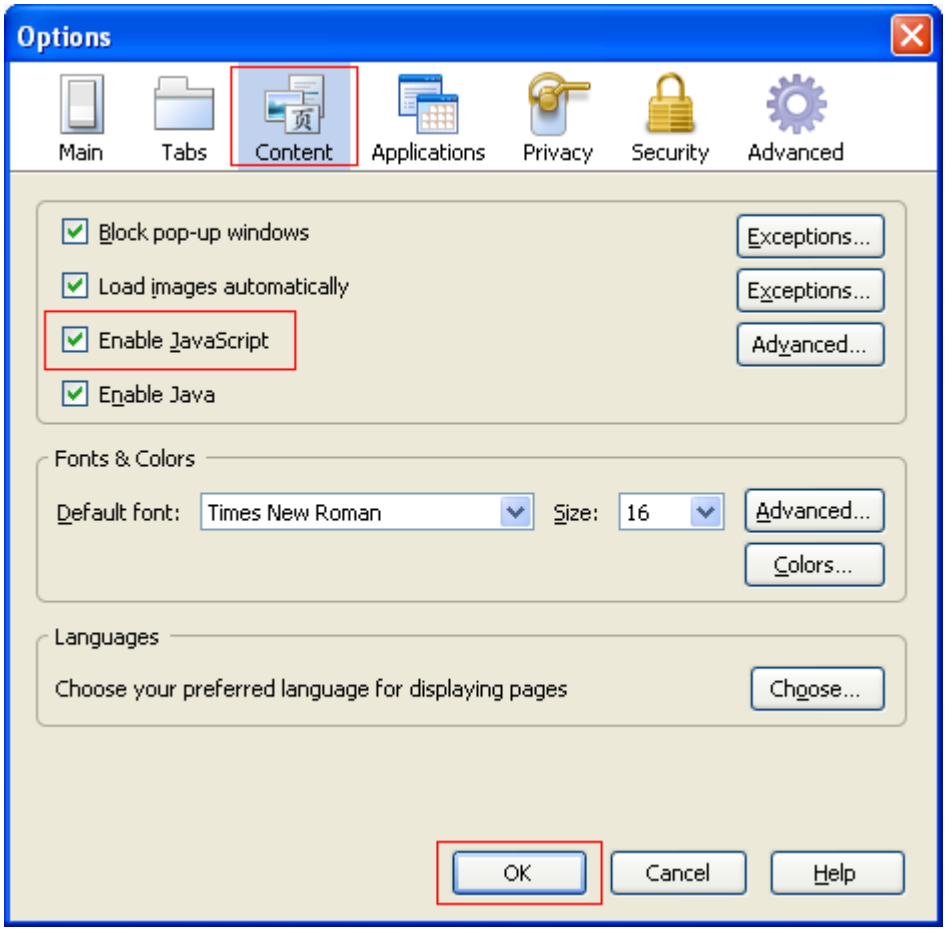


5. Click **OK** in the **Security Settings** dialog box.

Configuring Firefox Web browser settings

1. Open the Firefox Web browser, and select **Tools** > **Options**.
2. Click the **Content** tab, select the **Enable JavaScript** box, and click **OK**.

Figure 52 Firefox Web browser setting



Accessing the device through SNMP

NOTE:

Accessing the device through SNMP is not supported in FIPS mode.

You can run SNMP on an NMS to access the device MIB and perform GET and SET operations to manage and monitor the device. The device supports SNMPv1, SNMPv2c, and SNMPv3, and can work with various network management software products, including IMC. For more information about SNMP, see *System Management and Maintenance Configuration Guide*.

By default, SNMP access is disabled. To enable SNMP access, log in to the device through any other method and configure SNMP login.

Configuring SNMP access

Connect the PC (the NMS) and the device to the network, making sure they can reach each other, as shown in Figure 53. This document describes only the basic SNMP configuration procedures on the device.

Figure 53 Network diagram

IMPORTANT:

To make SNMP operate correctly, make sure the SNMP settings (including the SNMP version) on the NMS are consistent with those on the firewall.

Prerequisites

- Assign an IP address to a Layer 3 interface on the firewall. By default, only interface GigabitEthernet 0/0 is assigned an IP address (192.168.0.1/24).
- Configure routes to make sure the NMS and the Layer 3 interface can reach each other.

Configuring SNMPv3 access

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A

Step	Command	Remarks
2. Enable the SNMP agent.	**snmp-agent**	Optional. By default, the SNMP agent is disabled. You can enable SNMP agent with this command or any command that begins with **snmp-agent**.
3. Configure an SNMP group and specify its access right.	**snmp-agent group v3** *group-name* [**authentication** | **privacy**] [**read-view** *read-view*] [**write-view** *write-view*] [**notify-view** *notify-view*] [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] *	By default, no SNMP group is configured. NOTE: Support for the **acl ipv6** *ipv6-acl-number* option depends on the device model. For more information, see *Getting Started Command Reference*.
4. Add a user to the SNMP group.	**snmp-agent usm-user v3** *user-name group-name* [[**cipher**] **authentication-mode** { **md5** | **sha** } *auth-password* [**privacy-mode** { **3des** | **aes128** | **des56** } *priv-password*]] [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] *	N/A NOTE: Support for the **acl ipv6** *ipv6-acl-number* option depends on the device model. For more information, see *Getting Started Command Reference*.

Configuring SNMPv1 or SNMPv2c access

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enable the SNMP agent.	**snmp-agent**	Optional. By default, the SNMP agent is disabled. You can enable SNMP agent with this command or any command that begins with **snmp-agent**.
3. Create or update MIB view information.	**snmp-agent mib-view** { **excluded** | **included** } *view-name oid-tree* [**mask** *mask-value*]	Optional. By default, the MIB view name is ViewDefault and OID is 1.

Step	Command	Remarks
4. Configure the SNMP access right.	• (Approach 1) Specify the SNMP NMS access right directly by configuring an SNMP community: **snmp-agent community** { **read** | **write** } *community-name* [**mib-view** *view-name*] [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] * • (Approach 2) Configure an SNMP group and add a user to the SNMP group: a. **snmp-agent group** { **v1** | **v2c** } *group-name* [**read-view** *read-view*] [**write-view** *write-view*] [**notify-view** *notify-view*] [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] * b. **snmp-agent usm-user** { **v1** | **v2c** } *user-name group-name* [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] *	Use either approach. The username in approach 2 is equivalent to the community name used in approach 1, and must be the same as the community name configured on the NMS. NOTE: Support for the **acl ipv6** *ipv6-acl-number* option depends on the device model. For more information, see *Getting Started Command Reference*.

SNMP login example

Network requirements

Configure the firewall and network management station so you can remotely manage the firewall through SNMPv3.

Figure 54 Network diagram

Configuration procedure

1. Configure the firewall:

   # Assign an IP address to the firewall. Make sure the firewall and the NMS can reach each other. (Details not shown.)

   # Enter system view.

   ```
   <Sysname> system-view
   ```

   # Enable the SNMP agent.

   ```
   [Sysname] snmp-agent
   ```

   # Configure an SNMP group.

   ```
   [Sysname] snmp-agent group v3 managev3group
   ```

   # Add a user to the SNMP group.

   ```
   [Sysname] snmp-agent usm-user v3 managev3user managev3group
   ```

2. Configure the NMS:

   Make sure the NMS has the same SNMP settings, including the username as the firewall. If not, the firewall cannot be discovered or managed by the NMS.

3. Use the network management station to discover, query, and configure the firewall. For more information, see the NMS manual.

Logging in to the firewall module from the network device

Feature and hardware compatibility

Hardware	Feature compatible
F1000-A-EI/F1000-S-EI	No
F1000-E	No
F5000	No
Firewall module	Yes
U200-A	No
U200-S	No

This chapter describes how to log in to the firewall module from the network device. Other login methods for the firewall module are the same as a firewall.

Logging in to the firewall module from the network device

Before logging in to the firewall module from the network device, you must configure the AUX user interface of the firewall module.

To configure the AUX user interface:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter AUX user interface view.	**user-interface aux** *first-number* [*last-number*]	N/A
3. Specify the none authentication mode.	**authentication-mode none**	By default, the AUX user interface uses password authentication.
4. Configure the user privilege level.	**user privilege level** *level*	0 by default. HP recommends you set it to 3.

To log in to the firewall module from the network device:

Task	Command	Remarks
Log in to the firewall module from the network device.	**oap connect slot** *slot-number*	Available in user view of the network device (switch or router).

After login, the terminal screen displays the CLI of the firewall module. To return to the CLI on the device, press **Ctrl+K**.

Monitoring and managing the firewall module on the network device

Resetting the system of the firewall module

CAUTION:

The reset operation may cause data loss and service interruption. Therefore, before performing this operation, save the configurations of the firewall module operating system and shut down the firewall module operating system to avoid service interruption and data loss.

If the operating system of the firewall module works abnormally (for example, the system does not respond), you can reset the system with the following command. This operation is the same as resetting the firewall module by pressing the reset button on the firewall module.

The firewall module has an independent CPU; therefore, the network device can still recognize and control the firewall module when you reset the system of firewall module.

To reset the system of the firewall module:

Task	Command	Remarks
Reset the system of the firewall module	**oap reboot slot** *slot-number*	Available in user view.

Configuring the ACSEI protocol

ACSEI is an HP-proprietary protocol. It provides a method for exchanging information between ACFP clients and ACFP server so that the ACFP server and clients can cooperate to run a service.

As a supporting protocol of ACFP, ACSEI also has two entities: server and client.

- The ACSEI server is integrated into the software system (Comware) of the network device.
- The ACSEI client is integrated into the software system (Comware) of the firewall module.

NOTE:

The collaborating IDS (Intrusion Detection System) modules or IDS devices serve as the ACFP clients which run applications of other vendors and support the IPS (Intrusion Prevention System)/IDS services.

ACSEI mainly provides the following functions:

- Registration and deregistration of an ACSEI client to the ACSEI server.
- ID assignment. The ACSEI server assigns IDs to ACSEI clients to distinguish between them.
- Mutual monitoring and awareness between an ACSEI client and the ACSEI server.
- Information interaction between the ACSEI server and ACSEI clients, including clock synchronization.
- Control of the ACSEI clients on the ACSEI server. For example, you can close or restart an ACSEI client on the ACSEI server.

An ACSEI server can register multiple ACSEI clients.

ACSEI timers

An ACSEI server uses two timers, the clock synchronization timer and the monitoring timer:

- The clock synchronization timer is used to periodically trigger the ACSEI server to send clock synchronization advertisements to ACSEI clients. You can set this timer through command lines.
- The monitoring timer is used to periodically trigger the ACSEI server to send monitoring requests to ACSEI clients. You can set this timer through command lines.

An ACSEI client starts two timers, the registration timer and the monitoring timer:

- The registration timer is used to periodically trigger the ACSEI client to multicast registration requests (with the multicast MAC address being 010F-E200-0021). You cannot set this timer.
- The monitoring timer is used to periodically trigger the ACSEI client to send monitoring requests to the ACSEI server. You cannot set this timer.

ACSEI startup and running

ACSEI starts up and runs in the following procedures:

The firewall module runs the ACSEI client application to enable ACSEI client.

Start up the network device and enable the ACSEI server function on it.

The ACSEI client multicasts a registration request.

After the ACSEI server receives a valid registration request, it negotiates parameters with the ACSEI client and establishes a connection with the client if the negotiation succeeds.

The ACSEI server and the ACSEI client mutually monitor the connection.

Upon detecting the disconnection of the ACSEI client, the ACFP server removes the configuration and policies associated with the client.

Configuring ACSEI server on the network device:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enable ACSEI server	**acsei server enable**	Disabled by default.
3.	Enter ACSEI server view	**acsei server**	N/A
4.	Configure the clock synchronization timer	**acsei timer clock-sync** *minutes*	Optional. Five minutes by default.
5.	Configure the monitoring timer	**acsei timer monitor** *seconds*	Optional. Five seconds by default.
6.	Close the specified ACSEI client	**acsei client close** *client-id*	Optional. Supported on the ACSEI client running Linux only.
7.	Restart the specified ACSEI client	**acsei client reboot** *client-id*	Optional.

Configuring ACSEI client on the firewall module

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter interface view	**interface** interface-type interface-number	N/A
3. Enable the ACSEI client	**acsei-client enable**	Disabled by default. The Comware platform can run only one ACSEI client, that is, the ACSEI client can be enabled on only one interface at a time. But the ACSEI client on the Comware platform and that on the firewall module can run simultaneously.

Displaying and maintaining ACSEI server and client

Task	Command	Remarks
On the network device:		
Display ACSEI client summary.	**display acsei client summary** [*client-id*]	Available in any view.
Display ACSEI client information.	**display acsei client info** [*client-id*]	Available in any view.
On the firewall module:		
Display ACSEI client information.	**display acsei-client information**	Available in any view.
Display current ACSEI client state.	**display acsei-client status**	Available in any view.

Example of monitoring and managing the firewall module from the network device

Network requirements

A firewall module is installed in slot 3 of the network device to detect the traffic passing the network device. The internal interface Ten-GigabitEthernet 3/0/1 on the network device is connected to the internal interface Ten-GigabitEthernet0/0 on the firewall module.

The network device redirects received traffic to the firewall module. The firewall module processes the traffic based on the configured security policy, and redirects permitted traffic to the network device for forwarding.

Configure the network device and firewall module so that you can log in to and restart the firewall module from the network device. Configure the clock synchronization timer as 10 minutes, and configure the monitoring timer as 10 seconds.

Figure 55 Network diagram

Configuration procedure

This example uses a switch. The configuration on a router is the same.

1. Log in to the firewall module from the network device:

   # Configure the AUX user interface of the firewall module.

   ```
   <FW module> system-view
   [FW module] user-interface aux 0
   [FW module-ui-aux0] authentication-mode none
   [FW module-ui-aux0] user privilege level 3
   [FW module-ui-aux0]
   ```

   # Log in to the firewall module.

   ```
   <Switch> oap connect slot 3
   Connected to OAP!
   <FW module>
   ```

2. Configure the clock synchronization timer and the monitoring timer on the network device:

   # Enable ACSEI server.

   ```
   <Switch> system-view
   [Switch] acsei server enable
   ```

   # Enter ACSEI server view.

   ```
   [Switch] acsei server
   ```

   # Set the clock synchronization timer to 10 minutes.

   ```
   [Switch-acsei server] acsei timer clock-sync 10
   ```

   # Set the monitoring timer to 10 seconds.

   ```
   [Switch-acsei server] acsei timer monitor 10
   ```

3. Enable ACSEI client on the Ten-GigabitEthernet 0/0 interface.

   ```
   <FW module> system-view
   [FW module] interface ten-gigabitethernet0/0
   [FW module] acsei-client enable
   ```

4. Verifying the configuration:

   # Restart the firewall module on the network device.

   ```
   <Switch> oap reboot slot 3
   This command will recover the OAP from shutdown or other failed state.
   Warning: This command may lose the data on the hard disk if the OAP is not being
    shut down! Continue? [Y/N]:y
   Reboot OAP by command.
   ```

   The output shows that you can restart the firewall module on the network device.

   # Display the ACSEI server configuration information on the network device.

   ```
   <Switch> display current-configuration configuration acsei-server
   ```

```
#
acsei server
 acsei timer clock-sync 10
 acsei timer monitor 10
#
return
[Switch]
```

The output shows that the clock synchronization timer and monitoring timer are 10 minutes and 10 seconds, respectively.

Basic configuration

Overview

Basic configuration information include:

- **Device name** and **login password**—Modify the system name and the password of the current user.
- **Service management**—Specify whether to enable the services like FTP, Telnet, HTTP, and HTTPS, and set port numbers for HTTP and HTTPS.
- **Interface IP address**—Configure IP addresses for Layer 3 Ethernet interfaces and VLAN interfaces.
- **NAT**—Configure dynamic NAT, internal server translation, and related parameters.
- **Security zone**—Add interfaces to security zones. After you add interfaces to security zones, you can apply security policies to the interfaces or their IP addresses based on security zones.

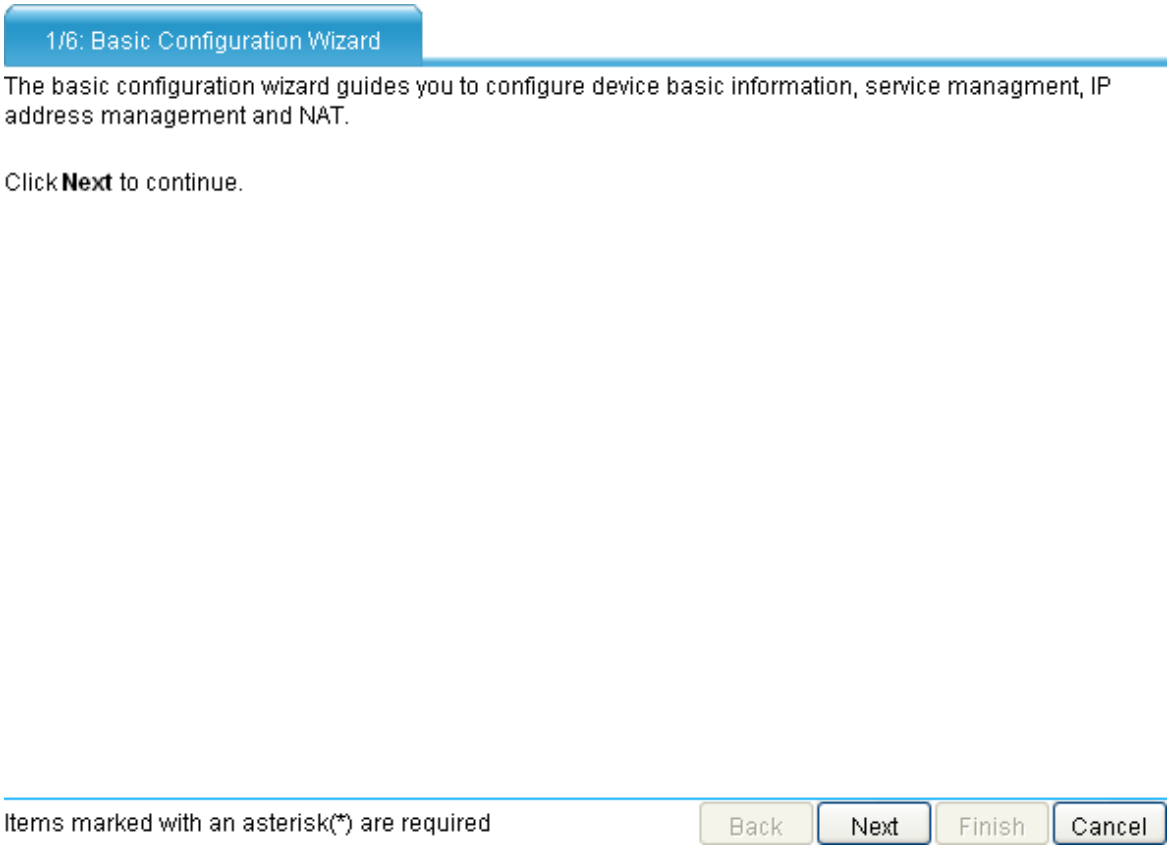
You can configure basic configuration information at the CLI or in the Web interface. This chapter describes how to configure basic configuration information at the CLI and through the basic configuration wizard. For more information, see the following configuration guides:

- **Device name**—"Managing the device."
- **Login password**—"Managing users."
- **Service management**—*Access Control Configuration Guide*.
- **Interface IP address**—*Network Management Configuration Guide*.
- **NAT**—*NAT and ALG Configuration Guide*.
- **Security zone**—*Access Control Configuration Guide*.

Performing basic configuration in the Web interface

1. Select **Wizard** from the navigation tree.
2. Click the **Basic Device Information** hyperlink.

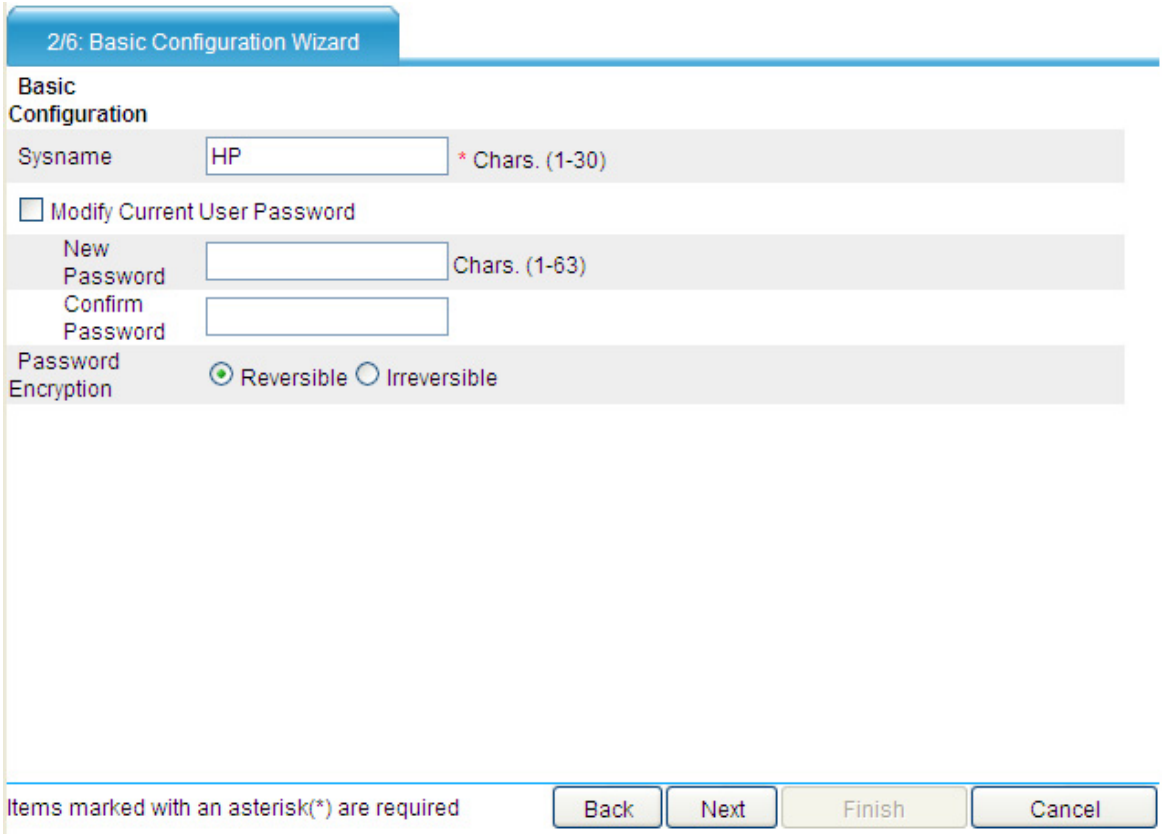
Figure 56 Basic configuration wizard—1/6


1/6: Basic Configuration Wizard
The basic configuration wizard guides you to configure device basic information, service managment, IP address management and NAT.
Click Next to continue.
Items marked with an asterisk(*) are required
Back
Next
Finish
Cancel

3. Click **Next.**

   The page for basic configuration appears.

Figure 57 Basic configuration wizard—2/6 (basic information)



4. Configure the parameters as described in Table 11.

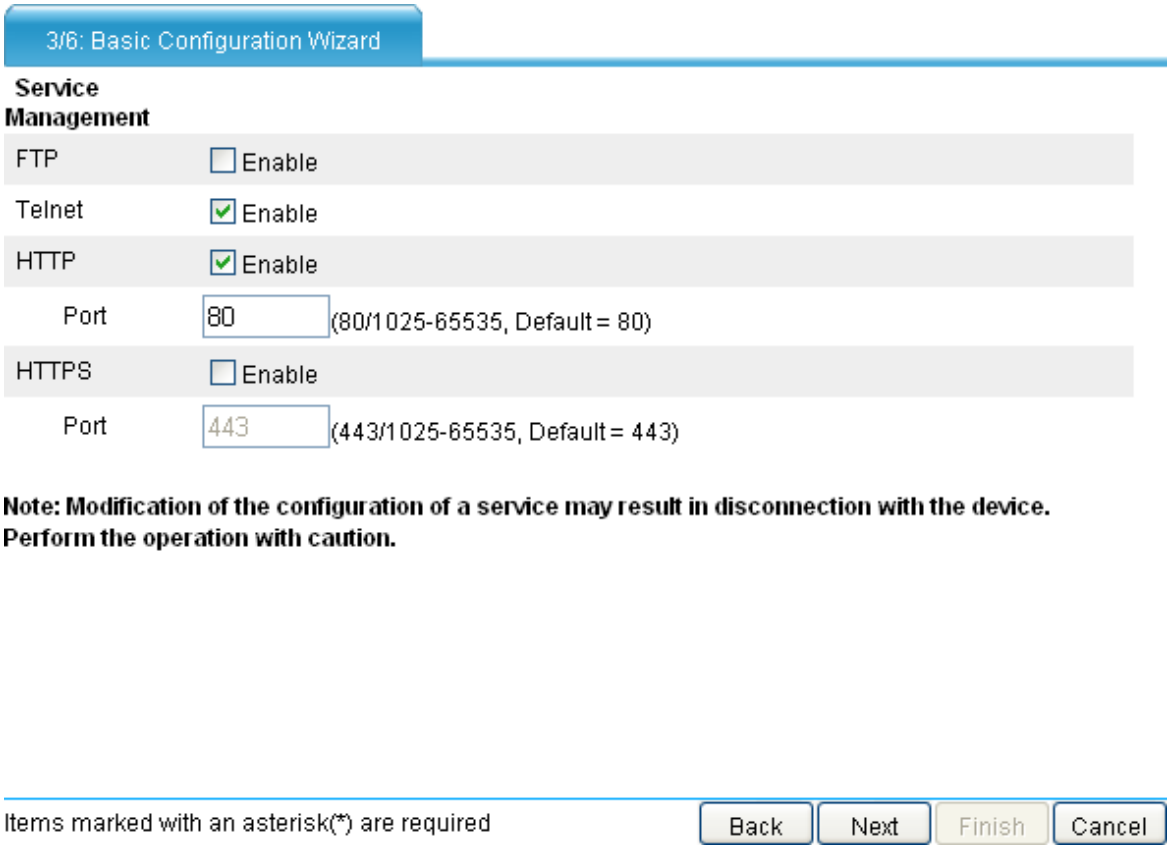
Table 11 Configuration items

Item	Description
Sysname	Enter the system name.
Modify Current User Password	Specify whether to modify the login password of the current user.
New Password	To modify the password of the current user, set the new password and the confirm password, and the two passwords must be identical.
Confirm Password	IMPORTANT: You can modify the password of a user authenticated by local authentication only and cannot modify that of a user authenticated by remote authentication. If the name of a user authenticated by local authentication and that of a user authenticated by remote authentication are duplicated, your modification only takes effect on the user authenticated by local authentication.
Password Encryption	Specify the password encryption method: • Reversible: The device encrypts user passwords with a reversible encryption algorithm. • Irreversible: The device encrypts user passwords with an irreversible encryption algorithm.

5. Click **Next**.

   The page for configuring service management appears.

Figure 58 Basic configuration wizard—3/6 (service management)



6. Configure the parameters as described in Table 12.

Table 12 Configuration items

Item	Description
FTP	Specify whether to enable FTP on the device. Disabled by default.
Telnet	Specify whether to enable Telnet on the device. Disabled by default.
HTTP	Specify whether to enable HTTP on the device, and set the HTTP port number. Enabled by default. IMPORTANT: • If the current user has logged in to the Web interface through HTTP, disabling HTTP or modifying the HTTP port number will result in disconnection with the device. Therefore, perform the operation with caution. • When you modify a port number, make sure the port number is not used by another service.

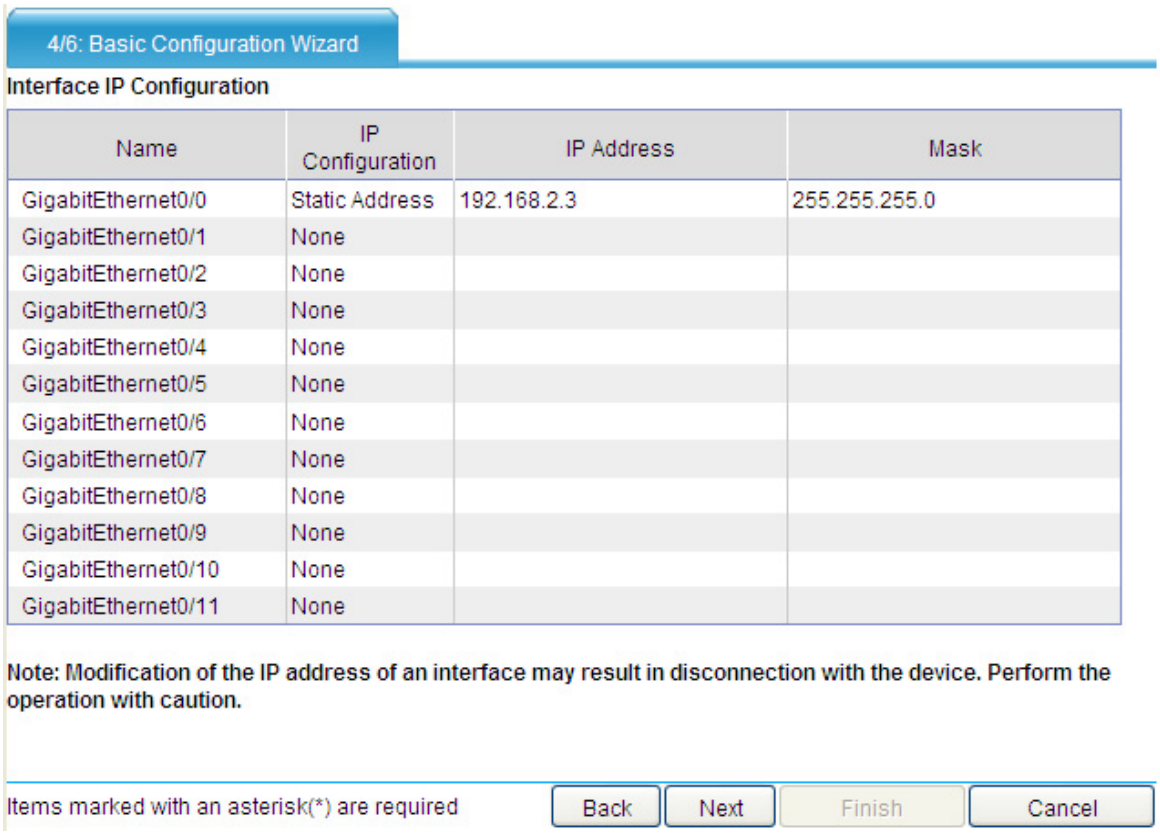
Item	Description
HTTPS	Specify whether to enable HTTPS on the device, and set the HTTPS port number. Disabled by default. IMPORTANT: • If the current user logged in to the Web interface through HTTPS, disabling HTTPS or modifying the HTTPS port number will result in disconnection with the device. Therefore, perform the operation with caution. • When you modify a port number, make sure the port number is not used by another service. • By default, HTTPS uses the PKI domain **default**. If this PKI domain does not exist, the system will prompt you for it when the configuration wizard is completed. However, this does not affect the execution of other configurations.

7. Click **Next**.

   The page for configuring interface IP appears.

   The table lists the IP address configuration information for all Layer 3 Ethernet interfaces and VLAN interfaces. You can click a value in the table and then modify it.

Figure 59 Basic configuration wizard—4/6 (interface IP address configuration)



8. Assign IP addresses to the interfaces.

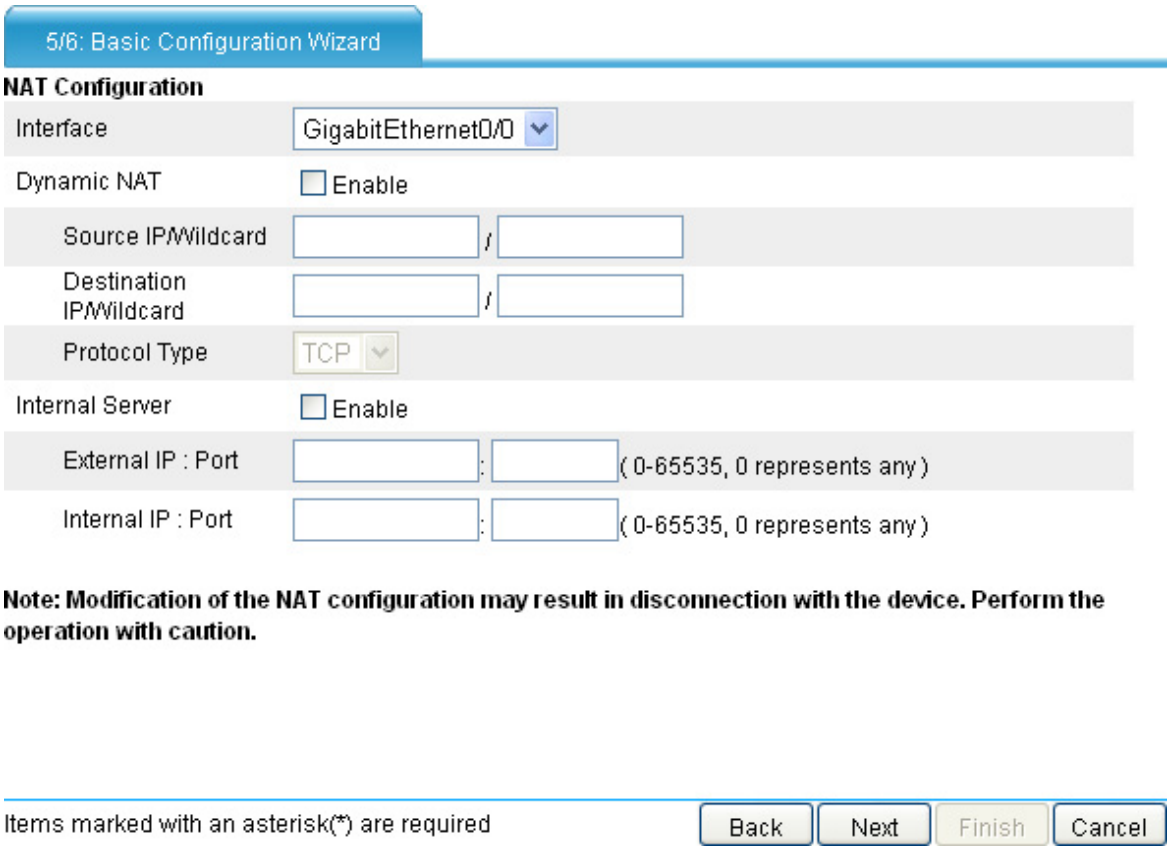
Table 13 Configuration items

Item	Description	
IP Configuration	Set the approach for obtaining the IP address, including: • **None**—The IP address of the interface is not specified. The interface has no IP address. • **Static Address**—Specify the IP address for the interface manually. If you select this item, specify both the IP address and the mask. • **DHCP**—The interface obtains an IP address automatically through the DHCP protocol. • **Do not change**—The IP address of the interface does not change.	IMPORTANT: Modification to the interface IP address results in disconnection with the device, so make changes with caution.
IP Address	If you select **Stack Address** as the approach for obtaining the IP address, set the interface IP address and network mask.	
Mask		

9. Click **Next**.

   The page for configuring NAT appears.

Figure 60 Basic configuration wizard—5/6 (NAT configuration)



10. Configure the parameters as described in Table 14.

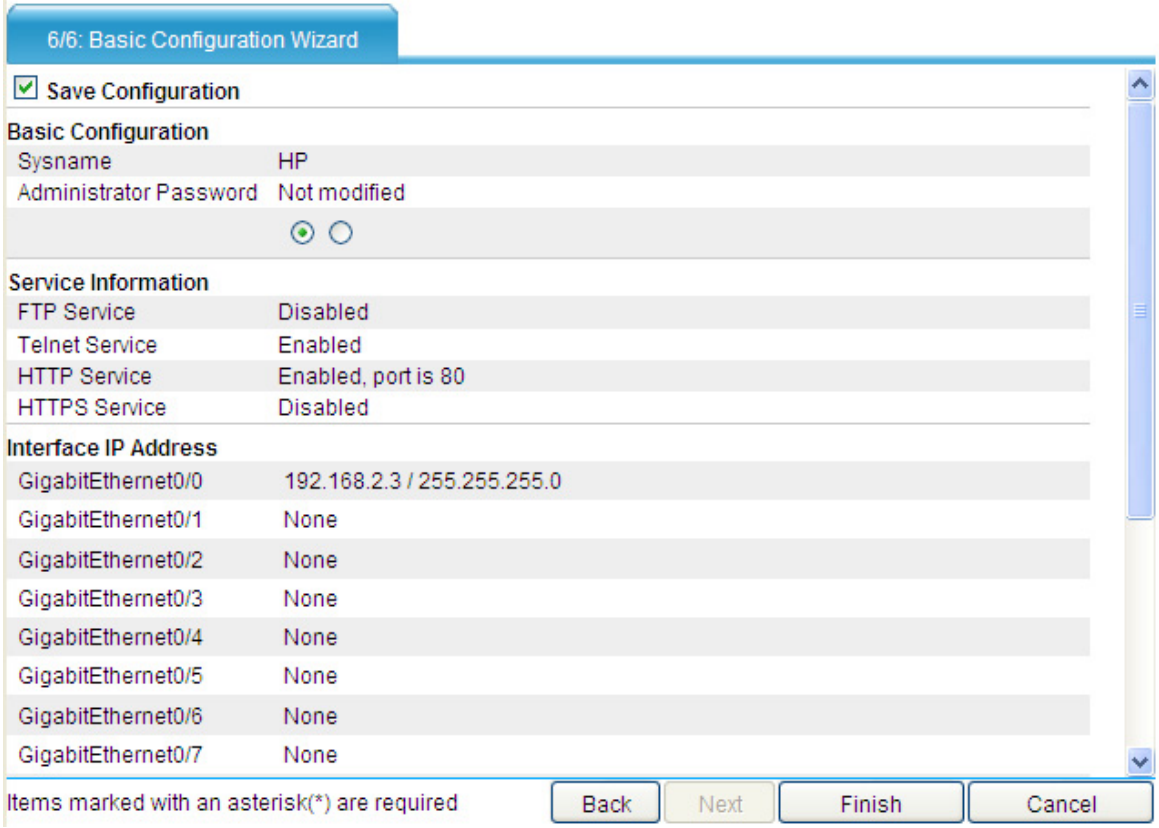
Table 14 Configuration items

Item	Description
Interface	Select an interface on which the NAT configuration will be applied.
Dynamic NAT	Specify whether to enable dynamic NAT on the interface. If dynamic NAT is enabled, the IP address of the interface will be used as the IP address of a matched packet after the translation. By default, dynamic NAT is disabled.
Source IP/Wildcard	If dynamic NAT is enabled, set the source IP address and wildcard for packets.
Destination IP/Wildcard	If dynamic NAT is enabled, set the destination IP address and wildcard for packets.
Protocol Type	If dynamic NAT is enabled, select the protocol type carried over the IP protocol, including TCP, UDP, and IP (indicating all protocols carried by the IP protocol).
Internal Server	Specify whether to enable the internal server. If the internal server is enabled, when a user from the external network accesses the internal server, the NAT translates the destination address of request packets into the private IP address of the internal server. When the internal server replies to the packets, the NAT translates the source address (private IP address) of reply packets into a public IP address. By default, the internal server is disabled. IMPORTANT: Configuration of the internal server may result in disconnection with the device (for example, specify an external IP address as the IP address of the local host or as the IP address of the current access interface). Perform the operation with caution.
External IP: Port	When you enable the internal server, set the valid IP address and service port number for the external access.
Internal IP: Port	If you enable the internal server, set the IP address and service port number for the server on the internal LAN.

11. Click **Next**.

    The page listing all configurations you have made in the basic configuration wizard appears.

Figure 61 Basic configuration wizard—6/6



On this page, you can set whether to save the current configuration to the startup configuration file (which can be **.cfg** or **.xml** file) for the next device boot when you submit the configurations.

12. Click **Finish** to confirm the configurations.

    To modify your configuration, click **Back** to go back to the previous page.

Performing basic configuration at the CLI

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Change the device name.	**sysname** *sysname*	Optional. **HP** by default.
3. Enable the Telnet service.	**telnet server enable**	Optional. Disabled by default.

Step	Command	Remarks
4. Configure NAT.	• To configure a static NAT mapping: a. **nat static** *local-ip* [**vpn-instance** *local-name*] *global-ip* [**vpn-instance** *global-name*] b. **interface** *interface-type interface-number* c. **nat outbound static** • To configure dynamic NAT: d. **interface** *interface-type interface-number* e. **nat outbound** [*acl-number*] [**address-group** *group-number* [**vpn-instance** *vpn-instance-name*] [**no-pat**]] [**track vrrp** *virtual-router-id*]	Optional. By default, NAT is not configured on an interface.
5. Configure the NAT server.	• For normal NAT server: ○ **nat server** [Index | acl-number] **protocol** pro-type **global** { global-address | **current-interface** | **interface** interface-type interface-number } global-port1 global-port2 [**vpn-instance** global-name] **inside** local-address1 local-address2 local-port [**vpn-instance** local-name] [**track vrrp** virtual-router-id] ○ **nat server** [Index | acl-number] **protocol** pro-type **global** { global-address | **current-interface** | **interface** interface-type interface-number } [global-port] [**vpn-instance** global-name] **inside** local-address [local-port] [**vpn-instance** local-name] [**track vrrp** virtual-router-id] • For ACL-based NAT server: **nat server protocol** *pro-type* **global** *acl-number* **inside** *local-address* [*local-port*] [**vpn-instance** *local-name*]	Optional. Configure none or one of the commands.
6. Assign an IP address to the interface.	**ip address** *ip-address* { *mask-length* | *mask* } [**sub**]	Optional. By default, GigabitEthernet 0/0 is assigned the IP address 192.168.0.1/24, and the other interfaces have no IP addresses.
7. Return to system view.	**quit**	N/A
8. Enter security zone view.	**zone name** *zone-name* [**id** *zone-id*]	N/A

Step	Command	Remarks
9. Add the interface to the security zone.	**import interface** *interface-type interface-number* [**vlan** *vlan-list*]	By default, GigabitEthernet 0/0 belongs to the Management zone and the other interfaces do not belong to any zone.
10. Return to system view.	**quit**	N/A
11. Save the running configuration to the configuration file and specify the file as the next-startup configuration file.	**save** [**safely**]	This command is available in any view.
12. Display the running configuration.	**display current-configuration**	Optional. This command is available in any view.

Configuration guidelines

To configure features after completing the basic configuration, you must add interfaces to security zones (except for Management) and configure interzone policies. For more information about security zones and interzone policies, see *Access Control Configuration Guide*.

Managing the device

Device management includes monitoring the operating status of devices and configuring their running parameters.

The configuration tasks in this document are order independent. You can perform these tasks in any order.

Feature and hardware compatibility

Hardware	Supported storage medium
F1000-A-EI/F1000-S-EI	flash0
F1000-E	cfa0
F5000	cfa0
Firewall module	cfa0
U200-A	cfa0
U200-S	cfa0

For description convenience, all examples in this chapter use the storage medium cfa0.

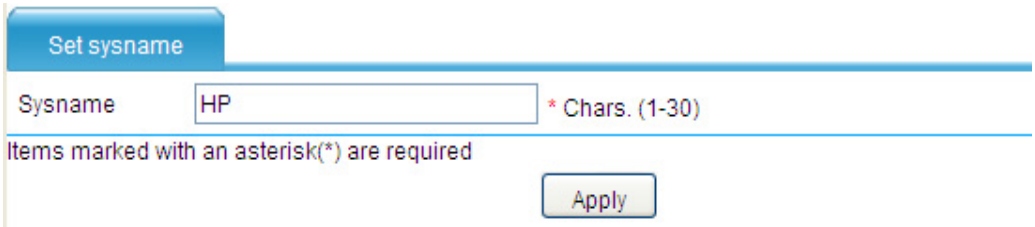
Configuring the device name in the Web interface

A device name identifies a device in a network.

To configure the device name:

1. Select **Device Management** > **Device Basic** > **Device Basic Info** from the navigation tree to enter the page shown in Figure 62.
2. Enter the system name.
3. Click **Apply**.

Figure 62 Device basic information



Configuring the device name at the CLI

A device name identifies a device in a network and works as the user view prompt at the CLI. For example, if the device name is **Sysname**, the user view prompt is <Sysname>.

To configure the device name:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Configure the device name.	**sysname** *sysname*	The default device name is HP.

Configuring the system time in the Web interface

A correct system time setting is essential to communication and network management. System time allows you to display and set the device system time, time zone, and daylight saving time on the Web interface. The device supports setting system time through manual configuration and automatic synchronization of NTP server time.

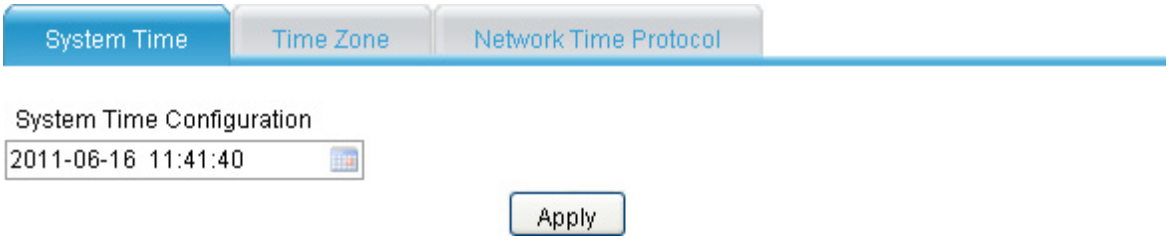
Defined in RFC 1305, the NTP synchronizes timekeeping among distributed time servers and clients. The purpose of using NTP is to keep consistent timekeeping among all clock-dependent devices within a network so that the devices can provide diverse applications based on the consistent time.

The time of a local system that runs NTP can be synchronized to other reference sources and used as a reference source to synchronize other clocks.

Displaying the current system time

Select **Device Management** > **System Time** from the navigation tree to enter the **System Time** tab page, as shown in Figure 63. The current system time of the device appears on the page.

Figure 63 System time page



Configuring the system time

1. Select **Device Management** > **System Time** from the navigation tree.

   The **System Time** page appears as shown in Figure 63.

2. Click the **System Time Configuration** text box.

   The calendar page appears.

Figure 64 Calendar page

3. Modify the system time either in the **System Time Configuration** text box, or through the calendar page.

   You can perform the following operations on the calendar page:

   - Click **Today** to set the current date on the calendar to the current system date of the local host, and the time stays unchanged.
   - Set the year, month, date and time, and then click **OK**.

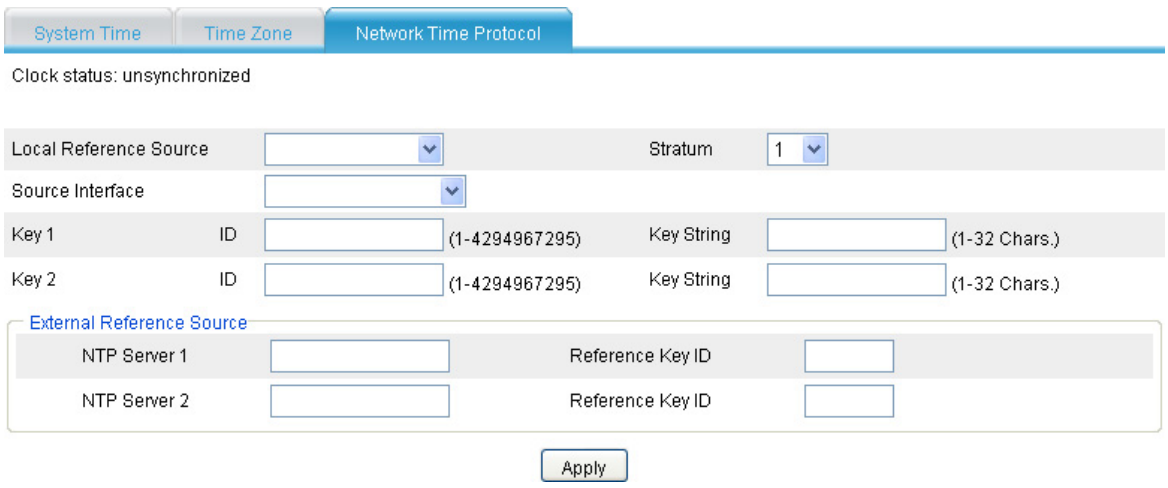
4. Click **Apply** in the system time configuration page to save your configuration.

Configuring the network time

1. Select **Device Management** > **System Time** from the navigation tree.
2. Click **Network Time Protocol**.

   The page for configuring network time appears.

Figure 65 Network time



3. Configure the network time as described in Table 15.
4. Click **Apply**.

Table 15 Configuration items

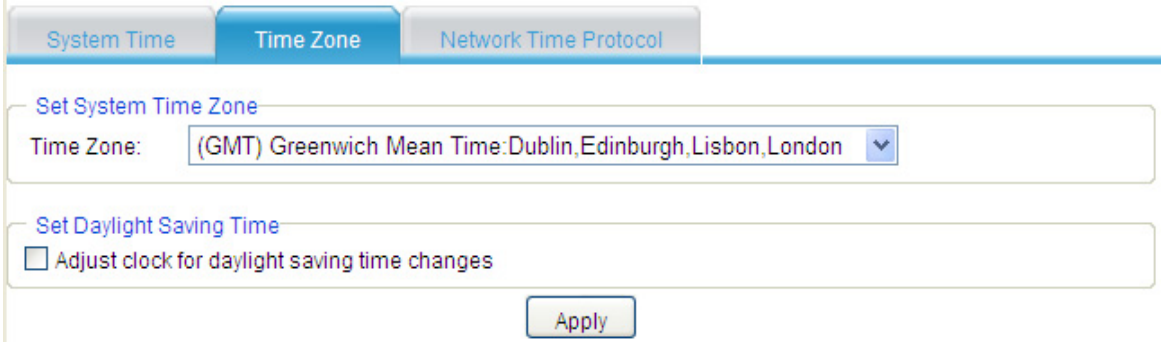
Item		Description
Clock status		Displays the synchronization status of the system clock.
Local Reference Source		Set the IP address of the local clock source to 127.127.1.u, where u ranges from 0 to 3, representing the NTP process ID. • If the IP address of the local clock source is specified, the local clock is used as the reference clock, and thus can provide time for other devices. • If the IP address of the local clock source is not specified, the local clock is not used as the reference clock.
Stratum		Set the stratum level of the local clock. The stratum level of the local clock decides the precision of the local clock. A higher value indicates a lower precision. A stratum 1 clock has the highest precision, and a stratum 16 clock is not synchronized and cannot be used as a reference clock.
Source Interface		Set the source interface for an NTP message. If you do not want the IP address of a certain interface on the local device to become the destination address of response messages, you can specify the source interface for NTP messages, so that the source IP address in the NTP messages is the primary IP address of this interface. If the specified source interface is down, the source IP address of the NTP messages sent is the primary IP address of the outbound interface.
Key 1		Set NTP authentication key. The NTP authentication feature should be enabled for a system running NTP in a network where there is a high security demand. This feature enhances the network security by means of client-server key authentication, which prohibits a client from synchronizing with a device that has failed authentication. You can set two authentication keys, each of which is composed of a key ID and key string. • ID is the ID of a key. • Key string is a character string for MD5 authentication key.
Key 2		
External Reference Source	NTP Server 1/Reference Key ID.	Specify the IP address of an NTP server, and configure the authentication key ID used for the association with the NTP server. Only if the key provided by the server is the same with the specified key will the device synchronize its time to the NTP server. You can configure two NTP servers. The clients will choose the optimal reference source. IMPORTANT: The IP address of an NTP server is a unicast address, and cannot be a broadcast or a multicast address, or the IP address of the local clock source.
	NTP Server 2/Reference Key ID.	

Configuring the time zone and daylight saving time

1. Select **Device** > **System Time** from the navigation tree.
2. Click **Time Zone**.

   The page for setting the time zone appears.

Figure 66 Setting the time zone

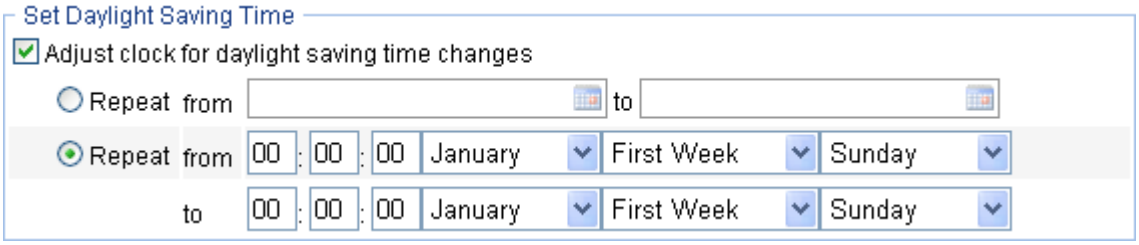


3. Configure the time zone and daylight saving time as described in Table 16.
4. Click **Apply**.

Table 16 Configuration items

Item	Description
Time Zone	Set the time zone for the system.
Adjust clock for daylight saving time changes	Adjust the system clock for daylight saving time changes, which means adding one hour to the current system time. Click **Adjust clock for daylight saving time changes** to expand the option, as shown in Figure 67. You can configure the daylight saving time changes in the following ways: • Specify that the daylight saving time starts on a specific date and ends on a specific date. The time range must be greater than one day and smaller than one year. For example, configure the daylight saving time to start on August 1st, 2006 at 06:00:00 a.m., and end on September 1st, 2006 at 06:00:00 a.m. • Specify that the daylight saving time starts and ends on the corresponding specified days every year. The time range must be greater than one day and smaller than one year. For example, configure the daylight saving time to start on the first Monday in August at 06:00:00 a.m., and end on the last Sunday in September at 06:00:00 a.m.

Figure 67 Setting the daylight saving time


Set Daylight Saving Time
Adjust clock for daylight saving time changes
Repeat from to
Repeat from 00 : 00 : 00 January First Week Sunday
to 00 : 00 : 00 January First Week Sunday

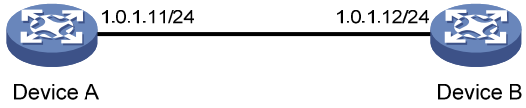
Date and time configuration example

In this example, Device A is the firewall.

Network requirements

The local clock of Device A is set as the reference clock, with the stratum of 2. Device B operates in client mode, and uses Device A as the NTP server.

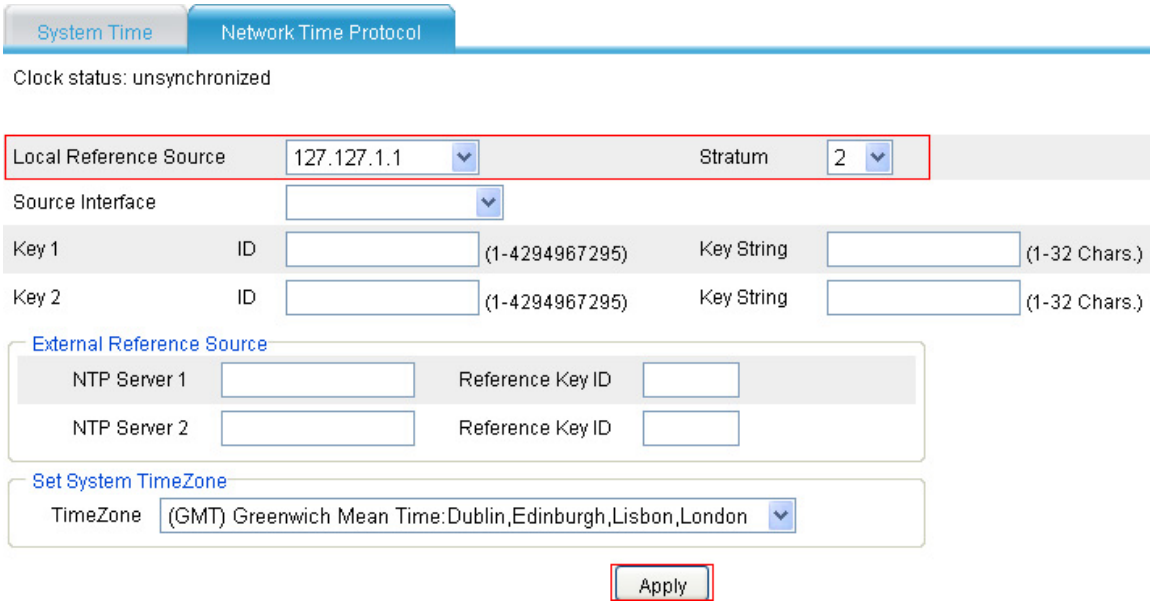
Figure 68 Network diagram



Configuration procedure

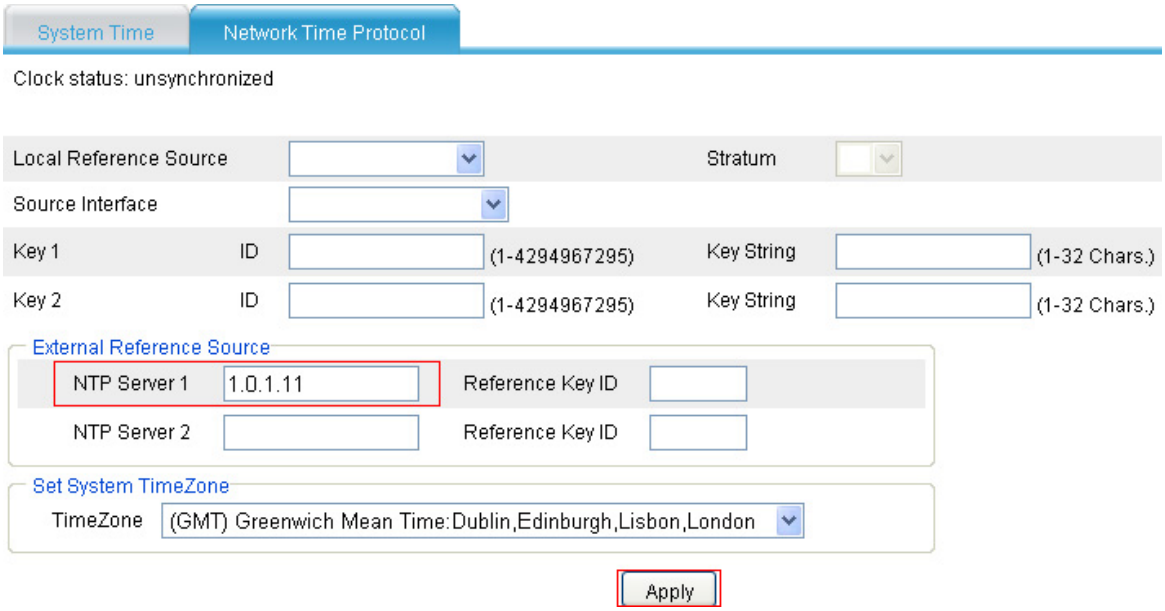
1. On Device A, configure the local clock as the reference clock, with the stratum 2:
   a. Select **Device Management** > **System Time** from the navigation tree.
   b. Click **Network Time Protocol**.
      The page for setting up NTP appears.
   c. Select **127.127.1.1** from the **Local Reference Source** list.
   d. Select **2** from the **Stratum** list.
   e. Click **Apply**.

Figure 69 Configuring the local clock as the reference clock



2. On Device B, configure Device A as the NTP server of Device B:
   a. Select **Device Management** > **System Time** from the navigation tree.
   b. Click **Network Time Protocol**.
      The page for setting up NTP appears.
   c. Enter **1.0.1.11** in the **NTP Server 1** box.
   d. Click **Apply**.

Figure 70 Configuring Device A as the NTP server of Device B



3. Verifying the configuration

After the configuration, you can see that the current system time displayed on the **System Time** page is the same for Device A and Device B.

Configuration guidelines

A device can act as a server to synchronize the clock of other devices only after its clock has been synchronized. If the clock of a server has a stratum level higher than or equal to that of a client's clock, the client will not synchronize its clock to the server's.

The synchronization process takes a period of time. Therefore, the clock status may be **unsynchronized** after your configuration. In this case, you can refresh the page to view the clock status later on.

If the system time of the NTP server is ahead of the system time of the device, and the difference between them exceeds the Web idle time specified on the device, all online Web users are logged out because of timeout.

Configuring the system time at the CLI

You must synchronize your device with a trusted time source by using NTP or changing the system time before you run it on the network. Network management depends on an accurate system time setting, because the timestamps of system messages and logs use the system time. For NTP configuration, see *Network Management and Monitoring Configuration Guide*.

In a small-sized network, you can manually set the system time of each device.

IMPORTANT:

If you reboot the device, the system time and date are restored to the factory default. To ensure an accurate system time setting, you must change the system time and date or configure NTP for the device.

Configuration guidelines

You can change the system time by configuring the relative time, time zone, and daylight saving time. The configuration result depends on their configuration order (see Table 17). In the first column of this table, 1 represents the **clock datetime** command, 2 represents the **clock timezone** command, and 3 represents the **clock summer-time** command. To verify the system time setting, use the **display clock** command. This table assumes that the original system time is 2005/1/1 1:00:00.

Table 17 System time configuration results

Command	Effective system time	Configuration example	System time
1	*date-time*	`clock datetime 1:00 2007/1/1`	01:00:00 UTC Mon 01/01/2007.
2	Original system time ± *zone-offset*	`clock timezone zone-time add 1`	02:00:00 zone-time Sat 01/01/2005.
1, 2	*date-time* ± *zone-offset*	`clock datetime 2:00 2007/2/2` `clock timezone zone-time add 1`	03:00:00 zone-time Fri 02/02/2007.
2, 1	*date-time*	`clock timezone zone-time add 1` `clock datetime 3:00 2007/3/3`	03:00:00 zone-time Sat 03/03/2007.
3	The original system time outside the daylight saving time range: The system time does not change until it falls into the daylight saving time range.	`clock summer-time ss one-off 1:00 2006/1/1 1:00 2006/8/8 2`	01:00:00 UTC Sat 01/01/2005.
	The original system time in the daylight saving time range: The system time increases by *summer-offset*.	`clock summer-time ss one-off 00:30 2005/1/1 1:00 2005/8/8 2`	03:00:00 ss Sat 01/01/2005. If the original system time plus *summer-offset* is beyond the daylight saving time range, the original system time does not change. After you disable the daylight saving setting, the system time automatically decreases by *summer-offset*.

Command	Effective system time	Configuration example	System time
1, 3	*date-time* outside the daylight saving time range: *date-time*	`clock datetime 1:00 2007/1/1` `clock summer-time ss one-off 1:00 2006/1/1 1:00 2006/8/8 2`	01:00:00 UTC Mon 01/01/2007.
	date-time in the daylight saving time range: *date-time* + *summer-offset*	`clock datetime 8:00 2007/1/1` `clock summer-time ss one-off 1:00 2007/1/1 1:00 2007/8/8 2`	10:00:00 ss Mon 01/01/2007. If the *date-time* plus *summer-offset* is outside the daylight saving time range, the system time equals *date-time*. After you disable the daylight saving setting, the system time automatically decreases by *summer-offset*.
3, 1 (*date-time* outside the daylight saving time range)	*date-time*	`clock summer-time ss one-off 1:00 2007/1/1 1:00 2007/8/8 2` `clock datetime 1:00 2008/1/1`	01:00:00 UTC Tue 01/01/2008.
3, 1 (*date-time* in the daylight saving time range)	*date-time* – *summer-offset* outside the daylight saving time range: *date-time* – *summer-offset*	`clock summer-time ss one-off 1:00 2007/1/1 1:00 2007/8/8 2` `clock datetime 1:30 2007/1/1`	23:30:00 UTC Sun 12/31/2006.
	date-time – *summer-offset* in the daylight saving time range: *date-time*	`clock summer-time ss one-off 1:00 2007/1/1 1:00 2007/8/8 2` `clock datetime 3:00 2007/1/1`	03:00:00 ss Mon 01/01/2007.
2, 3 or 3, 2	Original system clock ± zone-offset outside the daylight saving time range: Original system clock ± *zone-offset*	`clock timezone zone-time add 1` `clock summer-time ss one-off 1:00 2007/1/1 1:00 2007/8/8 2`	02:00:00 zone-time Sat 01/01/2005.
	Original system clock ± zone-offset outside the daylight saving time range: Original system clock ± *zone-offset* + summer-offset	`clock timezone zone-time add 1` `clock summer-time ss one-off 1:00 2005/1/1 1:00 2005/8/8 2`	System clock configured: 04:00:00 ss Sat 01/01/2005.

Command	Effective system time	Configuration example	System time

1, 2, 3 or 1, 3, 2	*date-time* ± *zone-offset* outside the daylight saving time range:
	date-time ± *zone-offset*
		`clock datetime 1:00 2007/1/1`
		`clock timezone zone-time add 1`
		`clock summer-time ss one-off 1:00 2008/1/1 1:00 2008/8/8 2`
			02:00:00 zone-time Mon 01/01/2007.

	date-time ± *zone-offset* outside the daylight saving time range:
	date-time ± *zone-offset* + *summer-offset*
		`clock datetime 1:00 2007/1/1`
		`clock timezone zone-time add 1`
		`clock summer-time ss one-off 1:00 2007/1/1 1:00 2007/8/8 2`
			04:00:00 ss Mon 01/01/2007.

2, 3, 1 or 3, 2, 1	*date-time* outside the daylight saving time range:
	date-time
		`clock timezone zone-time add 1`
		`clock summer-time ss one-off 1:00 2008/1/1 1:00 2008/8/8 2`
		`clock datetime 1:00 2007/1/1`
			01:00:00 zone-time Mon 01/01/2007.

	date-time in the daylight saving time range, but *date-time* – *summer-offset* outside the summer-time range:
	date-time – *summer-offset*
		`clock timezone zone-time add 1`
		`clock summer-time ss one-off 1:00 2008/1/1 1:00 2008/8/8 2`
		`clock datetime 1:30 2008/1/1`
			23:30:00 zone-time Mon 12/31/2007.

	Both *date-time* and *date-time* – *summer-offset* in the daylight saving time range:
	date-time
		`clock timezone zone-time add 1`
		`clock summer-time ss one-off 1:00 2008/1/1 1:00 2008/8/8 2`
		`clock datetime 3:00 2008/1/1`
			03:00:00 ss Tue 01/01/2008.

Configuration procedure

To change the system time:

Step	Command	Remarks
1. Set the system time and date.	**clock datetime** *time date*	Optional. Available in user view.
2. Enter system view.	**system-view**	N/A
3. Set the time zone.	**clock timezone** *zone-name* { **add** | **minus** } *zone-offset*	Optional. Coordinated UTC time zone by default.

Step	Command	Remarks
4. Set a daylight saving time scheme.	• Set a non-recurring scheme: **clock summer-time** *zone-name* **one-off** *start-time start-date end-time end-date add-time* • Set a recurring scheme: **clock summer-time** *zone-name* **repeating** *start-time start-date end-time end-date add-time*	Optional. Use either command. By default, daylight saving time is disabled, and the UTC time zone applies.

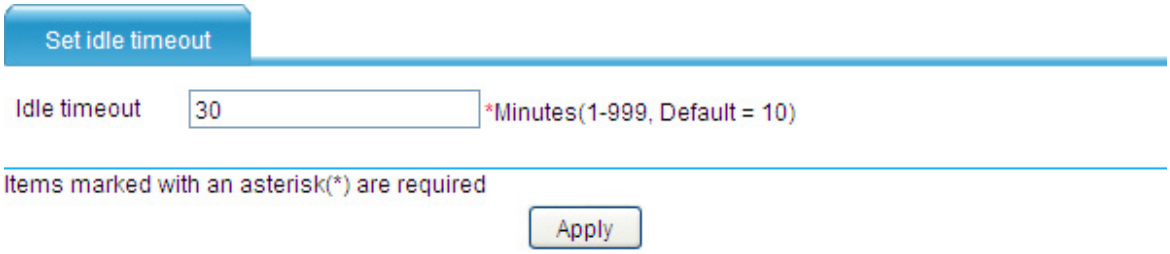
Setting the idle timeout timer in the Web interface

Perform this task to set the idle timeout period for logged-in users. The system logs out a user that is idle within the specified period.

To set Web idle timeout:

1. Select **Device Management** > **Device Basic** > **Web Management** from the navigation tree to enter the page shown in Figure 71.
2. Enter the idle timeout.
3. Click **Apply**.

Figure 71 Web management



Setting the idle timeout timer at the CLI

You can set the idle timeout timer for a logged-in user. After a user logs in to the firewall, if the user does not perform any operation when the timer expires, the firewall automatically tears down the connection to the user. If you set this timer to 0, the firewall does not tear down the connection automatically.

To set the idle timeout timer:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter user interface view.	**user-interface** { *first-num1* [*last-num1*] | { **aux** | **console** | **vty** } *first-num2* [*last-num2*] }	N/A
3. Set the idle timeout timer.	**idle-timeout** *minutes* [*seconds*]	10 minutes by default.

Enabling displaying the copyright statement

The device by default displays the copyright statement when a Telnet or SSH user logs in, or when a console or AUX user quits user view. You can disable or enable the function as needed. The following is a sample copyright statement:

```
**************************************************************************
* Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P.      *
* Without the owner's prior written consent,                             *
* no decompiling or reverse-engineering shall be allowed.                *
**************************************************************************
```

To enable displaying the copyright statement:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enable displaying the copyright statement.	**copyright-info enable**	Enabled by default.

Configuring banners

Banners are messages that the system displays during user login.

The system supports the following banners:

- **Legal banner**—Appears after the copyright or license statement. To continue login, the user must enter **Y** or press **Enter**. To quit the process, the user must enter **N**. **Y** and **N** are case-insensitive.
- **Message of the Day (MOTD) banner**—Appears after the legal banner and before the login banner.
- **Login banner**—Appears only when password or scheme authentication has been configured.
- **Incoming banner**—Appears for Modem users.
- **Shell banner**—Appears for non-Modem users.

Banner message input modes

You can configure a banner in one of the following ways:

- Single-line input

  Input the entire banner in the same line as the command. The start and end delimiters for the banner must be the same but can be any visible character. The input text, including the command keywords and the delimiters cannot exceed 510 characters. In this mode, do not press **Enter** before you input the end delimiter. For example, you can configure the shell banner "Have a nice day." as follows:

  ```
  <System> system-view
  [System] header shell %Have a nice day.%
  ```

- Multiple-line input

  Input message text in multiple lines. In this approach, the message text can be up to 2000 characters. Use one of the following methods to implement multi-line input mode:

- **Method 1**—Press **Enter** after the last command keyword. At the system prompt, enter the banner message and end with the delimiter character %. For example, you can configure the banner "Have a nice day. Please input the password." as follows:

```
<System> system-view
[System] header shell
Please input banner content, and quit with the character '%'.
Have a nice day.
Please input the password.%
```

- **Method 2**—After you type the last command keyword, type any single character as the start delimiter for the banner and press **Enter**. At the system prompt, type the banner and end the last line with a delimiter that is the same as the start delimiter. For example, you can configure the banner "Have a nice day. Please input the password." as follows:

```
<System> system-view
[System] header shell A
Please input banner content, and quit with the character 'A'.
Have a nice day.
Please input the password.A
```

- **Method 3**—After you type the last keyword, type the start delimiter and part of the banner and press **Enter**. At the system prompt, enter the rest of the banner and end the last line with a delimiter that is the same as the start delimiter. For example, you can configure the banner "Have a nice day. Please input the password." as follows:

```
<System> system-view
[System] header shell AHave a nice day.
Please input banner content, and quit with the character 'A'.
Please input the password.A
```

Configuration procedure

To configure banners:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Configure the incoming banner.	**header incoming** *text*	Optional.
3.	Configure the login banner.	**header login** *text*	Optional.
4.	Configure the legal banner.	**header legal** *text*	Optional.
5.	Configure the shell banner.	**header shell** *text*	Optional.
6.	Configure the MOTD banner.	**header motd** *text*	Optional.

Configuring the maximum number of concurrent users

You can configure this command to limit the number of users that can enter the system view simultaneously. When the number of concurrent users reaches the upper limit, other users cannot enter system view.

When multiple users configure a setting in system view, only the last configuration applies.

To configure the maximum number of concurrent users:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Configure the maximum number of concurrent users.	**configure-user count** *number*	By default, up to two users can perform operations in system view at the same time.

Configuring the exception handling method

You can configure the device to handle system exceptions in one of the following methods:

- **reboot**—The device automatically reboots to recover from the error condition.
- **maintain**—The device stays in the error condition so you can collect complete data, including error messages, for diagnosis. In this approach, you must manually reboot the device.

To configure the exception handling method:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Configure the exception handling method for the system.	**system-failure** { **maintain** | **reboot** }	By default, the system uses the **reboot** method when an exception occurs.

Rebooting the device

You can reboot the device in one of the following ways to restore the device from an error condition or place the new software of the device into effect:

- Reboot the device immediately in the Web or at the CLI.
- At the CLI, schedule a reboot to occur at a specific time and date or after a delay.
- Power off and then power on the device. This method might cause data loss, and is the least-preferred method.

Reboot in the Web or at the CLI enables easy remote device maintenance.

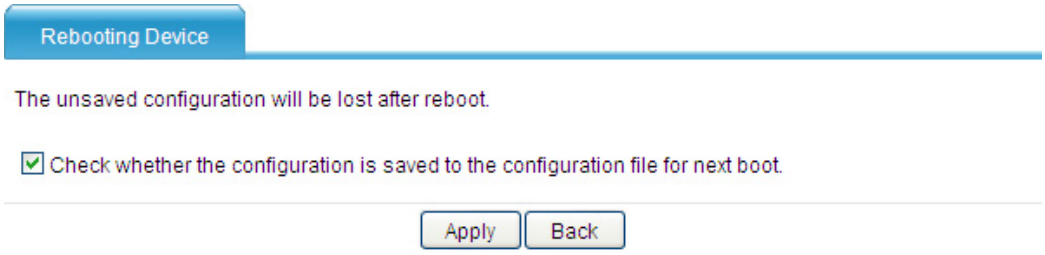
Rebooting the firewall in the Web interface

CAUTION:

- Rebooting the device results in service interruption.
- To avoid configuration loss, save the configuration before rebooting the device. For how to save the running configuration, see *System Management and Maintenance Configuration Guide*.

1. Select **Device Management** > **Reboot** from the navigation tree.

Figure 72 Rebooting the device


Rebooting Device
The unsaved configuration will be lost after reboot.
Check whether the configuration is saved to the configuration file for next boot.
Apply
Back

2. If necessary, select **Check whether the configuration is saved to the configuration file for next reboot**.

   If you select this option, the device checks whether the configuration file for the next startup reflects the running configuration. If yes, the device reboots. If not, a prompt is displayed and the device does not reboot. You can save the configuration and try to reboot the device again.

   If you do not select this option, the device directly reboots.

3. Click **Apply**.

   A confirmation dialog box appears.

4. Confirm the reboot operation.

Rebooting the firewall at the CLI

CAUTION:

- Device reboot can interrupt network services.
- To avoid data loss, use the **save** command to save the current configuration before a reboot.
- Use the **display startup** and **display boot-loader** commands to verify that you have correctly set the startup configuration file and the main system software image file. If the main system software image file has been corrupted or does not exist, the device cannot reboot. You must re-specify a main system software image file, or power off the device and then power it on so the system can reboot with the backup system software image file.

Rebooting devices immediately at the CLI

To reboot a device, execute the following command in user view:

Task	Command
Reboot a subcard or the device immediately.	**reboot**

Scheduling a device reboot

The switch supports only one device reboot schedule. If you configure the **schedule reboot delay** command multiple times, the last configuration takes effect. The **schedule reboot at** command and the **schedule reboot delay** command overwrite each other, and whichever is configured last takes effect.

For data security, if you are performing file operations at the reboot time, the system does not reboot.

To schedule a device reboot, execute one of the following commands in user view:

Task	Command	Remarks
Schedule a reboot.	• Schedule a reboot to occur at a specific time and date: **schedule reboot at** *hh:mm* [*date*] • Schedule a reboot to occur after a delay: **schedule reboot delay** { *hh:mm* | *mm* }	Use either command. The scheduled reboot function is disabled by default. Changing any clock setting can cancel the reboot schedule.

Scheduling jobs

You can schedule a job to automatically run a command or a set of commands without administrative interference. The commands in a job are polled every minute. When the scheduled time for a command is reached, the job automatically executes the command. If a confirmation is required while the command is running, the system automatically enters **Y** or **Yes**. If characters are required, the system automatically enters a default character string or an empty character string when no default character string is available.

Job configuration approaches

You can configure jobs in a non-modular or modular approach. Use the non-modular approach for a one-time command execution and use non-modular approach for complex maintenance work.

Table 18 A comparison of non-modular and modular approaches

Comparison item	Scheduling a job in the non-modular approach	Scheduling a job in the modular approach
Configuration method	Configure all elements in one command.	Separate job, view, and time settings.
Can multiple jobs be configured?	No.	Yes.
Can a job have multiple commands?	No. If you use the **schedule job** command multiple times, the most recent configuration takes effect.	Yes. You can use the **time** command in job view to configure commands to be executed at different time points.
Supported views	User view and system view. In the **schedule job** command, shell represents user view, and system represents system view.	All views. In the **time** command, monitor represents user view.
Supported commands	Commands in user view and system view.	Commands in all views.
Can a job be executed multiple times?	No.	Yes.
Can a job be saved?	No.	Yes.

Configuration guidelines

- To have a job successfully run a command, make sure the specified view and command are valid. The system does not verify their validity.

- After job execution, the configuration interface, view, and user status that you have before job execution restores even if the job ran a command to change the user interface (for example, **telnet**, **ftp**, and **ssh2**), the view (for example, **system-view** and **quit**), or the user status (for example, **super**).
- The jobs run in the background without displaying any messages except log, trap and debugging messages.
- If you reboot the device, the system time and date are restored to the factory default. To make sure scheduled jobs can be executed at the expected time, you must change the system time and date or configure NTP for the device. For NTP configuration, see *Network Management and Monitoring Configuration Guide*.
- In the modular approach:
  - Every job can have only one view and up to 10 commands. If you specify multiple views, the one specified last takes effect.
  - Enter a view name in its complete form. Most commonly used view names include **monitor** for user view, **system** for system view, **GigabitEthernet x/x** for Ethernet interface view, and **Vlan-interfacex** for VLAN interface view.
  - The time ID (*time-id*) must be unique in a job. If two time and command bindings have the same time ID, the one configured last takes effect.

Scheduling a job in the non-modular approach

To schedule a job, execute one of the following commands in user view:

Task	Command	Remarks
Schedule a job.	• Schedule a job to run a command at a specific time: **schedule job at** *time* [*date*] **view** *view command* • Schedule a job to run a command after a delay: **schedule job delay** *time* **view** *view command*	Use either command. If you execute the **schedule job** command multiple times, the most recent configuration takes effect. Changing any clock setting can cancel the job set by using the **schedule job** command.

Scheduling a job in the modular approach

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Create a job and enter job view.	**job** *job-name*	N/A
3.	Specify the view in which the commands in the job run.	**view** *view-name*	You can specify only one view for a job. The job executes all commands in the specified view.

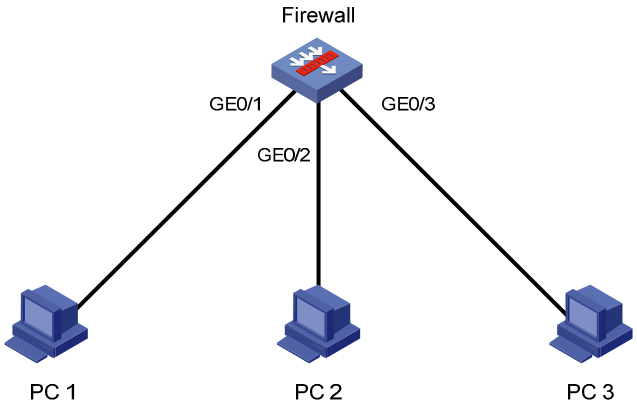
Step	Command	Remarks
4. Add commands to the job.	• Configure a command to run at a specific time and date: **time** *time-id* **at** *time date* **command** *command* • Configure a command to run at a specific time: **time** *time-id* { **one-off** | **repeating** } **at** *time* [**month-date** *month-day* | **week-day** *week-daylist*] **command** *command* • Configure a command to run after a delay: **time** *time-id* { **one-off** | **repeating** } **delay** *time* **command** *command*	Use any of the commands. Changing a clock setting does not affect the schedule set by using the **time at** or **time delay** command.

Scheduled job configuration example

Network requirements

Configure scheduled jobs on the firewall to enable interfaces GigabitEthernet 0/1, GigabitEthernet 0/2, and GigabitEthernet 0/3 at 8:00 and disabled them at 18:00 on working days every week, to control the access of the PCs connected to these interfaces.

Figure 73 Network diagram



Configuration procedure

Enter system view.

```
<Firewall> system-view
```

Create a job named **pc1**, and enter its view.

```
[Firewall] job pc1
```

Configure the job to be executed in the view of GigabitEthernet 0/1.

```
[Firewall-job-pc1] view gigabitethernet 0/1
```

Configure the firewall to enable GigabitEthernet 0/1 at 8:00 on working days every week.

```
[Firewall-job-pc1] time 1 repeating at 8:00 week-day mon tue wed thu fri command undo shutdown
```

Configure the firewall to shut down GigabitEthernet 0/1 at 18:00 on working days every week.

```
[Firewall-job-pc1] time 2 repeating at 18:00 week-day mon tue wed thu fri command shutdown
[Firewall-job-pc1] quit
```

Create a job named **pc2**, and enter its view.

```
[Firewall] job pc2
```

Configure the job to be executed in the view of GigabitEthernet 0/2.

```
[Firewall-job-pc2] view gigabitethernet 0/2
```

Configure the firewall to enable GigabitEthernet 0/2 at 8:00 on working days every week.

```
[Firewall-job-pc2] time 1 repeating at 8:00 week-day mon tue wed thu fri command undo
shutdown
```

Configure the firewall to shut down GigabitEthernet 0/2 at 18:00 on working days every week.

```
[Firewall-job-pc2] time 2 repeating at 18:00 week-day mon tue wed thu fri command shutdown
[Firewall-job-pc2] quit
```

Create a job named **pc3**, and enter its view.

```
[Firewall] job pc3
```

Configure the job to be executed in the view of GigabitEthernet 0/3.

```
[Firewall-job-pc3] view gigabitethernet 0/3
```

Configure the firewall to enable GigabitEthernet 0/3 at 8:00 on working days every week.

```
[Firewall-job-pc3] time 1 repeating at 8:00 week-day mon tue wed thu fri command undo
shutdown
```

Configure the firewall to shut down GigabitEthernet 0/3 at 18:00 on working days every week.

```
[Firewall-job-pc3] time 2 repeating at 18:00 week-day mon tue wed thu fri command shutdown
[Firewall-job-pc3] quit
```

Display information about scheduled jobs.

```
[Firewall] display job
Job name: pc1
  Specified view: GigabitEthernet0/1
  Time 1: Execute command undo shutdown at 08:00 Mondays Tuesdays Wednesdays Thursdays
Fridays
  Time 2: Execute command shutdown at 18:00 Mondays Tuesdays Wednesdays Thursdays Fridays
Job name: pc2
  Specified view: GigabitEthernet0/2
  Time 1: Execute command undo shutdown at 08:00 Mondays Tuesdays Wednesdays Thursdays
Fridays
  Time 2: Execute command shutdown at 18:00 Mondays Tuesdays Wednesdays Thursdays Fridays
Job name: pc3
  Specified view: GigabitEthernet0/3
  Time 1: Execute command undo shutdown at 08:00 Mondays Tuesdays Wednesdays Thursdays
Fridays
  Time 2: Execute command shutdown at 18:00 Mondays Tuesdays Wednesdays Thursdays Fridays
```

Setting the port status detection timer

Some protocols might shut down ports under specific circumstances. For example, MSTP shuts down a BPDU guard–enabled port when the port receives a BPDU. In this case, you can set the port status detection timer. If the port is still down when the detection timer expires, the protocol module automatically cancels the shutdown action and restores the port to its original physical status.

To set the port status detection timer:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Set the port status detection timer.	**shutdown-interval** *time*	By default, the port status detection timer is 30 seconds.

Configuring temperature thresholds for a device or a module

Configuring basic temperature thresholds

The following matrix shows the feature and hardware compatibility:

Hardware	Feature compatible
F1000-A-EI/F1000-S-EI	No
F1000-E	Yes
F5000	Yes
Firewall module	12500/10500 Enhanced FW: No Others: Yes
U200-A	No
U200-S	Yes

You can set the temperature threshold to monitor the temperature of a device or a module. When the temperature reaches the threshold, the device generates alarms.

To configure basic temperature thresholds:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Configure the basic temperature thresholds for a device or a module.	**temperature-limit** *slot-number lower-value upper-value*	By default, the lower threshold is 0°C (32°F), and the upper threshold is 50°C (122°F).

Configuring advanced temperature thresholds

The following matrix shows the feature and hardware compatibility:

Hardware	Feature compatible
F1000-A-EI/F1000-S-EI	Yes
F1000-E	No
F5000	No

Hardware	Feature compatible
Firewall module	12500/10500 Enhanced FW: Yes Others: No
U200-A	Yes
U200-S	No

You can set the temperature thresholds to monitor the temperature of a module or a device.

- When the temperature drops below the lower threshold or reaches the warning threshold, the device logs the event and outputs a log message and a trap.
- When the temperature reaches the alarming threshold, the device logs the event and outputs a log message and a trap repeatedly in the terminal display, and alerts users through the LED on the device panel.

Due to temperature hysteresis, a temperature decreasing notification is later than the actual temperature decreasing event. Fan speed changes might cause the actual temperature value read after an alarm to be lower than the alarm temperature.

To configure advanced temperature thresholds:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Configure advanced temperature thresholds for a device or a module.	**temperature-limit slot** *slot-number* **hotspot** *sensor-number lowerlimit warninglimit* [*alarmlimit*]	The default temperature thresholds depend on the hotspot sensors. The warning and alarming thresholds must be higher than the lower temperature threshold. The alarming threshold must be higher than the warning threshold.

Monitoring an NMS-connected interface

The following matrix shows the feature and hardware compatibility:

Hardware	Feature compatible
F1000-A-EI/F1000-S-EI	Yes
F1000-E	No
F5000	No
Firewall module	No
U200-A	Yes
U200-S	Yes

Typically, the device does not send notifications to its NMS when the IP address of an interface changes. If the IP address of the interface used by the device to communicate with the NMS changes, the NMS will be unable to communicate with the device unless the new management IP address of the device is manually updated or the device is re-added with the new IP address to the NMS database.

To ensure management continuity, you can configure the device to monitor the NMS connected interface for IP address changes and notify the NMS to update with the new IP address for communicating with the device.

You can configure one primary and one secondary interface for the device to communicate with the NMS, but the device monitors only one of them for IP address change at one time. If the IP address of the monitored interface in UP state changes, whether because of manual reassignment or DHCP reassignment, the device notifies the NMS of the new IP address. The IP address changes of the interface not under monitor will be ignored.

The device preferentially monitors the primary interface. HP recommends you specify the interface that has better route or more reliable link as the primary.

The device changes the monitored interface only when the interface goes down, the interface IP address is deleted, or the role of the interface is removed by using the **undo nms** { **primary** | **secondary** } **monitor-interface** command.

Before you specify NMS-connected interfaces, make sure you have configured the NMS as the SNMP notification destination host. For more information about SNMP, see *System Management and Maintenance Configuration Guide*.

To monitor NMS-connected interfaces:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Specify NMS-connected interfaces.	• Specify the primary interface: **nms primary monitor-interface** *interface-type interface-number* • Specify the secondary interface: **nms secondary monitor-interface** *interface-type interface-number*	Configure at least one command. By default, no interfaces are configured as NMS-connected interfaces to be monitored. The monitoring function only applies to interfaces that use IPv4 addresses.

Clearing unused 16-bit interface indexes

The device must maintain persistent 16-bit interface indexes and keep one interface index match one interface name for network management. After deleting a logical interface, the device retains its 16-bit interface index so the same index can be assigned to the interface at interface re-creation.

To avoid index depletion causing interface creation failures, you can clear all 16-bit indexes that have been assigned but not in use. The operation does not affect the interface indexes of the interfaces that have been created but the indexes assigned to re-recreated interfaces might change.

A confirmation is required when you execute this command. The command will not run if you fail to make a confirmation within 30 seconds or enter **N** to cancel the operation.

To clear unused 16-bit interface indexes, execute one of the following commands in user view:

Task	Command
Clear unused 16-bit interface indexes.	**reset unused porttag**

Verifying and diagnosing transceiver modules

This section describes how to verify and diagnose transceiver modules.

Verifying transceiver modules

You can verify the genuineness of a transceiver module in the following ways:

- Display the key parameters of a transceiver module, including its transceiver type, connector type, central wavelength of the transmit laser, transfer distance and vendor name.
- Display its electronic label. The electronic label is a profile of the transceiver module and contains the permanent configuration including the serial number, manufacturing date, and vendor name. The data is written to the storage component during debugging or testing.

To verify transceiver modules, execute the following commands in any view:

Task	Command
Display key parameters of the transceiver modules.	**display transceiver interface** [*interface-type interface-number*] [**|** { **begin** | **exclude** | **include** } *regular-expression*]
Display transceiver modules' electrical label information.	**display transceiver manuinfo interface** [*interface-type interface-number*] [**|** { **begin** | **exclude** | **include** } *regular-expression*]

Diagnosing transceiver modules

The device provides the alarm function and digital diagnosis function for transceiver modules. When a transceiver module fails or works inappropriately, you can examine the alarms present on the transceiver module to identify the fault source or examine the key parameters monitored by the digital diagnosis function, including the temperature, voltage, laser bias current, TX power, and RX power.

To diagnose transceiver modules, execute the following commands in any view:

Step		Command	Remarks
1.	Display alarms present on transceiver modules.	**display transceiver alarm interface** [*interface-type interface-number*] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	N/A
2.	Display the measured values of the digital diagnosis parameters for transceiver modules.	**display transceiver diagnosis interface** [*interface-type interface-number*] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	N/A
3.	Enter system view.	**system-view**	N/A
4.	Disable alarm traps for transceiver modules.	**transceiver phony-alarm-disable**	Optional. By default, alarm traps are enabled for transceiver modules.

Displaying and maintaining device management

For diagnosis or troubleshooting, you can use separate **display** commands to collect running status data module by module, or use the **display diagnostic-information** command to bulk collect running data for multiple modules.

Task	Command	Remarks
Display system version information.	**display version** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display the system time and date.	**display clock** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display information about the users that have logged in to the device but are not under user view.	**display configure-user** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display the software and hardware copyright statements.	**display copyright** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display flow engine usage statistics.	**display flowengine-usage** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view. NOTE: Support for this command depends on the device model. For more information, see *Getting Started Command Reference*.
Display historical flow engine usage statistics in charts.	**display flowengine-usage history** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view. NOTE: Support for this command depends on the device model. For more information, see *Getting Started Command Reference*.
Display or save running status data for multiple feature modules.	**display diagnostic-information** [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display CPU usage statistics.	**display cpu-usage** [*entry-number* [*offset*] [**verbose**] [**from-device**]] [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display historical CPU usage statistics in charts.	**display cpu-usage history** [**task** *task-id*] [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display information about the device's modules, CF cards, USB devices, and PCB board.	**display device** [**cf-card** | **usb**] [**slot** *slot-number* | **verbose**] [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view. The current software version does not support USB. The USB interfaces are reserved for future use.
Display the electronic label data for the device.	**display device manuinfo** [**slot** *slot-number*] [| { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.

Task	Command	Remarks
Display basic device temperature information.	**display environment** [**cpu**] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view. NOTE: Support for this command depends on the device model. For more information, see *Getting Started Command Reference*.
Display advanced device temperature information.	**display environment** [**slot** *slot-number* | **vent**] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view. Support for this command depends on the device model. For more information, see *Getting Started Command Reference*.
Display the operating states of fans.	**display fan** [*fan-id* | **verbose**] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view. NOTE: Support for this command depends on the device model. For more information, see *Getting Started Command Reference*.
Display memory usage statistics.	**display memory** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display power supply information.	**display power** [*power-id*] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view. NOTE: Support for this command depends on the device model. For more information, see *Getting Started Command Reference*.
Display RPS status information.	**display rps** [*rps-id*] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view. NOTE: Support for this command depends on the device model. For more information, see *Getting Started Command Reference*.
Display the mode of the last reboot.	**display reboot-type** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display the configuration of the job configured by using the **schedule job** command.	**display schedule job** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display the reboot schedule.	**display schedule reboot** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display the configuration of jobs configured by using the **job** command.	**display job** [*job-name*] [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.

Task	Command	Remarks
Display the exception handling method.	**display system-failure** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.

Managing users

Local users are a set of user attributes configured on the local device. A local user is uniquely identified by username. To enable users using a certain network service to pass the local authentication, you must configure accounts for the users to the local user database on the device.

A local user has the following attributes:

- Username
- User password
- User privilege level
- Service type that the user can use
- Virtual device to which the user belongs

User levels

User levels, from low to high, are **visitor**, **monitor**, **configure**, and **management**. A user with a higher level has all the operating rights of a lower level.

- **Visitor**—Users of this level can perform ping and traceroute operations, but can neither access the device data nor configure the device.
- **Monitor**—Users of this level can only access the device data but cannot configure the device.
- **Configure**—Users of this level can access data from the device and configure the device, but they cannot upgrade the host software, add/delete/modify users, or back up/restore the application file.
- **Management**—Users of this level can perform any operations for the device.

The previously mentioned user levels apply to users using root virtual devices only.

Configuring a local user in the Web interface

Configuration procedure

To configure a local user:

1. Select **User** > **Local User** from the navigation tree.

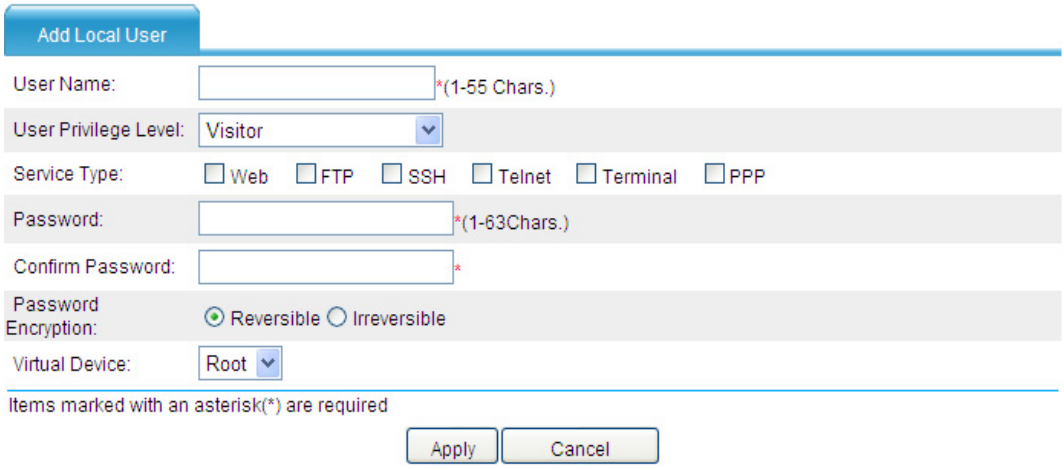
Figure 74 Local user

User Name	User Privilege Level	Service Type	Virtual Device	Operation
admin	Management	Web; Telnet;	Root	
user_vda	Visitor	Telnet;	VD_A	
user_vdb	Management	Web; Telnet;	VD_B	

Add

2. Click **Add**.

Figure 75 Adding a local user



3. Configure a local user, as described in Table 19.
4. Click **Apply**.

Table 19 Configuration items

Item	Description
User Name	Enter the username of the local user. The username can contain spaces in the middle. However, the device ignores any leading spaces in the username.
User Privilege Level	Set the user privilege level of a user. For more information, see "User levels." IMPORTANT: • The user privilege levels apply only to Web, FTP, Telnet, and SSH users. • Users that use the root virtual device and users that use other virtual devices have different privilege levels. For more information, see "Web overview."
Service Type	Set the service type that a user can use, including Web, FTP, SSH, Telnet, Terminal, DVPN, and PPP. Support for service types depends on the device model. For more information, see Table 20. You must configure a service type for each user for local authentication. Otherwise, user authentication fails.
Password Confirm Password	Set and confirm the password. The confirm password must be the same as the previously set password. Any leading spaces in the password are ignored.
Password Encryption	Specify the password encryption method: • Reversible: The device encrypts user passwords with a reversible encryption algorithm. • Irreversible: The device encrypts user passwords with an irreversible encryption algorithm.

Item	Description
Virtual Device	Set the virtual device to which a user belongs. Every time a user logs in through the Web interface, the user logs in to the virtual device to which the user belongs. When a root virtual device user with privilege level **Configure** or **Management** logs in to the device, the user can log in to another virtual device by selecting **Device** > **Virtual Device** > **Virtual Device**. The access right of the user is the same as other virtual device users that have the same privilege level.

Table 20 Service type feature and hardware compatibility

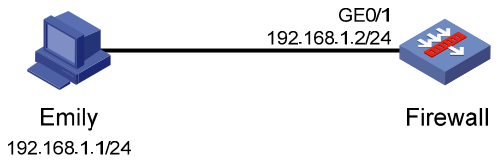
Hardware	Feature compatible
F1000-A-EI/F1000-S-EI	Does not support the DVPN service type.
F1000-E	Supports all service types.
F5000	Supports all service types.
Firewall module	Supports all service types.
U200-A	Does not support the DVPN service type.
U200-S	Does not support the DVPN service type.

Configuration example

Network requirements

As shown in Figure 76, configure the firewall to allow user Emily to log in to the firewall (root virtual device) through the Web interface and view the data on the firewall, but prevent the user from performing any configurations.

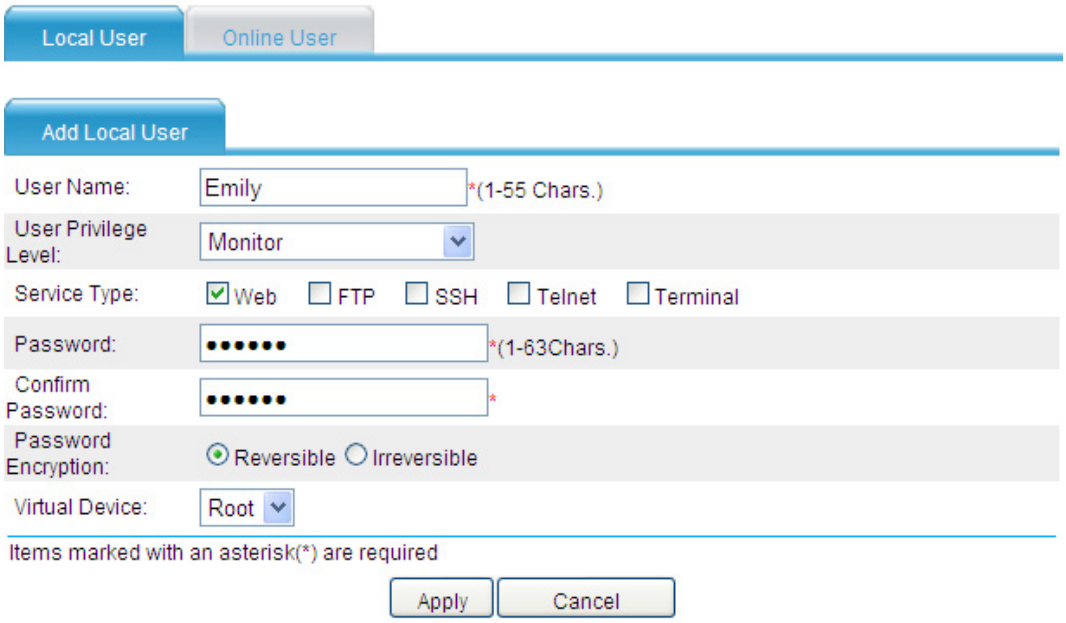
Figure 76 Network diagram



Configuration procedure

1. Configure the IP address of the interface and the zone to which it belongs. (Details not shown.)
2. Configure local user **Emily**:
   a. Select **User** > **Local User** from the navigation tree.
   b. Click **Add**.

Figure 77 Creating a local user



c. Enter **Emily** as the username.
d. Select the user privilege level **Monitor**.
e. Select the service type **Web**.
f. Enter **aabbcc** as the password and confirm the password.
g. Select the virtual device **Root**.
h. Click **Apply**.

Configuring a local user at the CLI

For more information, see *Access Control Configuration Guide*.

Controlling user logins

User login control can be configured only at the CLI.

Use ACLs to prevent unauthorized logins. For more information about ACLs, see *Access Control Configuration Guide*.

Configuring Telnet login control

Use a basic ACL (2000 to 2999) to filter Telnet traffic by source IP address. Use an advanced ACL (3000 to 3999) to filter Telnet traffic by source and/or destination IP address. Use an Ethernet frame header ACL (4000 to 4999) to filter Telnet traffic by source MAC address.

To access the device, a Telnet user must match a permit statement in the ACL applied to the user interface.

Configuring source IP-based Telnet login control

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Create a basic ACL and enter its view, or enter the view of an existing basic ACL.	**acl** [**ipv6**] **number** *acl-number* [**name** *name*] [**match-order** { **config** | **auto** }]	By default, no basic ACL exists.
3.	Configure an ACL rule.	• For IPv4 networks: **rule** [*rule-id*] { **deny** | **permit** } [**counting** | **fragment** | **logging** | **source** { *sour-addr sour-wildcard* | **any** } | **time-range** *time-range-name* | **vpn-instance** *vpn-instance-name*] * • For IPv6 networks: **rule** [*rule-id*] { **deny** | **permit** } [**counting** | **fragment** | **logging** | **routing** [**type** *routing-type*] | **source** { *ipv6-address prefix-length* | *ipv6-address/prefix-length* | **any** } | **time-range** *time-range-name* | **vpn-instance** *vpn-instance-name*] *	By default, a basic ACL does not contain any rule. The **logging** keyword takes effect only when the module (such as the firewall) using the ACL supports the logging function. NOTE: Support for the *ipv6-address* argument depends on the device model. For more information, see *Getting Started Command Reference*.
4.	Exit the basic ACL view.	**quit**	N/A
5.	Enter user interface view.	**user-interface** [*type*] *first-number* [*last-number*]	N/A
6.	Use the ACL to control user logins by source IP address.	**acl** [**ipv6**] *acl-number* { **inbound** | **outbound** }	• **inbound**: Filters incoming packets. • **outbound**: Filters outgoing packets. NOTE: Support for the **ipv6** keyword depends on the device model. For more information, see *Getting Started Command Reference*.

Configuring source/destination IP-based Telnet login control

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Create an advanced ACL and enter its view, or enter the view of an existing advanced ACL.	**acl** [**ipv6**] **number** *acl-number* [**name** *name*] [**match-order** { **config** | **auto** }]	By default, no advanced ACL exists. NOTE: Support for the **ipv6** keyword depends on the device model. For more information, see *Getting Started Command Reference*.

Step		Command	Remarks
3.	Configure an ACL rule.	**rule** [*rule-id*] { **permit** | **deny** } *rule-string*	N/A
4.	Exit advanced ACL view.	**quit**	N/A
5.	Enter user interface view.	**user-interface** [*type*] *first-number* [*last-number*]	N/A
6.	Apply the ACL to the user interfaces.	**acl** [**ipv6**] *acl-number* { **inbound** | **outbound** }	• **inbound**: Filters incoming Telnet packets. • **outbound**: Filters outgoing Telnet packets. NOTE: Support for the **ipv6** keyword depends on the device model. For more information, see *Getting Started Command Reference*.

Configuring source MAC-based Telnet login control

Ethernet frame header ACLs apply to Telnet traffic only if the Telnet client and server are located in the same subnet.

To configure source MAC-based Telnet login control:

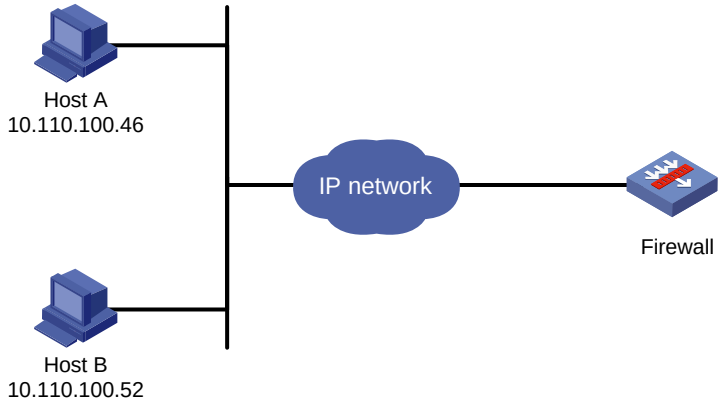
Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Create an Ethernet frame header ACL and enter its view.	**acl number** *acl-number* [**name** *name*] [**match-order** { **config** | **auto** }]	By default, no Ethernet frame header ACL exists.
3.	Configure an ACL rule.	**rule** [*rule-id*] { **permit** | **deny** } *rule-string*	N/A
4.	Exit Ethernet frame header ACL view.	**quit**	N/A
5.	Enter user interface view.	**user-interface** [*type*] *first-number* [*last-number*]	N/A
6.	Use the ACL to control user logins by source MAC address.	**acl** *acl-number* **inbound**	**inbound**: Filters incoming packets.

Telnet login control configuration example

Network requirements

Configure the firewall in Figure 78 to permit only incoming Telnet packets sourced from Host A and Host B.

Figure 78 Network diagram



Configuration procedure

Configure basic ACL 2000, and configure rule 1 to permit packets sourced from Host B, and rule 2 to permit packets sourced from Host A.

```
<Firewall> system-view
[Firewall] acl number 2000 match-order config
[Firewall-acl-basic-2000] rule 1 permit source 10.110.100.52 0
[Firewall-acl-basic-2000] rule 2 permit source 10.110.100.46 0
[Firewall-acl-basic-2000] quit
```

Reference ACL 2000 on user interfaces VTY 0 through VTY 4 so only Host A and Host B can Telnet to the firewall.

```
[Firewall] user-interface vty 0 4
[Firewall-ui-vty0-4] acl 2000 inbound
```

Configuring source IP-based SNMP login control

Use a basic ACL (2000 to 2999) to control SNMP logins by source IP address. To access the requested MIB view, an NMS must use a source IP address permitted by the ACL.

To configure source IP-based SNMP login control:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Create a basic ACL and enter its view, or enter the view of an existing basic ACL.	**acl** [**ipv6**] **number** *acl-number* [**name** *name*] [**match-order** { **config** | **auto** }]	By default, no basic ACL exists. NOTE: Support for the **ipv6** keyword depends on the device model. For more information, see *Getting Started Command Reference*.

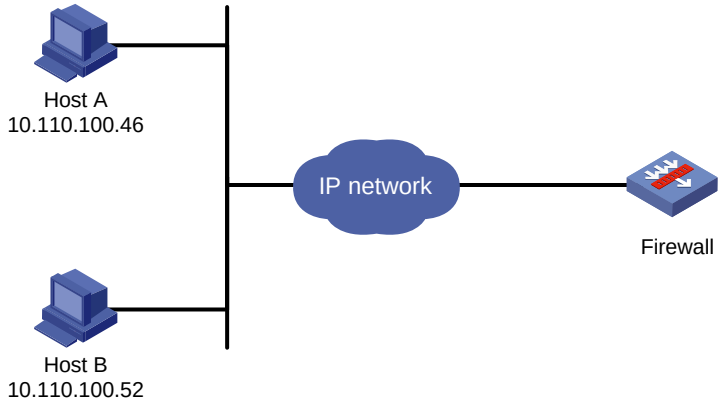
Step		Command	Remarks
3.	Configure an ACL rule.	**rule** [*rule-id*] { **deny** | **permit** } [**counting** | **fragment** | **logging** | **source** { *sour-addr sour-wildcard* | **any** } | **time-range** *time-range-name* | **vpn-instance** *vpn-instance-name*] *	N/A
4.	Exit the basic ACL view.	**quit**	N/A
5.	Apply the ACL to an SNMP community, group, or user.	• **SNMPv1/v2c community:** **snmp-agent community** { **read** | **write** } *community-name* [**mib-view** *view-name*] [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] * • SNMPv1/v2c group: **snmp-agent group** { **v1** | **v2c** } *group-name* [**read-view** *read-view*] [**write-view** *write-view*] [**notify-view** *notify-view*] [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] * • SNMPv3 group: **snmp-agent group v3** *group-name* [**authentication** | **privacy**] [**read-view** *read-view*] [**write-view** *write-view*] [**notify-view** *notify-view*] [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] * • SNMPv1/v2c user: **snmp-agent usm-user** { **v1** | **v2c** } *user-name group-name* [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] * • SNMPv3 user: **snmp-agent usm-user v3** *user-name group-name* [[**cipher**] **authentication-mode** { **md5** | **sha** } *auth-password* [**privacy-mode** { **3des** | **aes128** | **des56** } *priv-password*]] [**acl** *acl-number* | **acl ipv6** *ipv6-acl-number*] *	For more information about SNMP, see *System Management and Maintenance Configuration Guide*. NOTE: Support for the **ipv6** *ipv6-acl-number* option depends on the device model. For more information, see *Getting Started Command Reference*.

SNMP login control configuration example

Network requirements

Configure the firewall in Figure 79 to allow Host A and Host B to access the firewall through SNMP.

Figure 79 Network diagram



Configuration procedure

Create ACL 2000, and configure rule 1 to permit packets sourced from Host B, and rule 2 to permit packets sourced from Host A.

```
<Firewall> system-view
[Firewall] acl number 2000 match-order config
[Firewall-acl-basic-2000] rule 1 permit source 10.110.100.52 0
[Firewall-acl-basic-2000] rule 2 permit source 10.110.100.46 0
[Firewall-acl-basic-2000] quit
```

Associate the ACL with the SNMP community and the SNMP group.

```
[Firewall] snmp-agent community read aaa acl 2000
[Firewall] snmp-agent group v2c groupa acl 2000
[Firewall] snmp-agent usm-user v2c usera groupa acl 2000
```

Configuring Web login control

Use a basic ACL (2000 to 2999) to filter HTTP/HTTPS traffic by source IP address for Web login control. To access the device, a Web user must use an IP address permitted by the ACL.

You can also log off suspicious Web users that have been logged in.

Configuring source IP-based Web login control

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Create a basic ACL and enter its view, or enter the view of an existing basic ACL.	**acl** [**ipv6**] **number** *acl-number* [**name** *name*] [**match-order** { **config** | **auto** }]	By default, no basic ACL exists. NOTE: Support for the **ipv6** *ipv6-acl-number* option depends on the device model. For more information, see *Getting Started Command Reference*.

Step		Command	Remarks
3.	Create rules for this ACL.	**rule** [*rule-id*] { **deny** | **permit** } [**counting** | **fragment** | **logging** | **source** { *sour-addr sour-wildcard* | **any** } | **time-range** *time-range-name* | **vpn-instance** *vpn-instance-name*] *	N/A
4.	Exit the basic ACL view.	**quit**	N/A
5.	Associate the HTTP service with the ACL.	**ip http acl** *acl-number*	Configure either or both of the commands. HTTP login and HTTPS login are separate login methods. To use HTTPS login, you do not need to configure HTTP login.
6.	Associate the HTTPS service with the ACL.	**ip https acl** *acl-number*	

Logging off online Web users

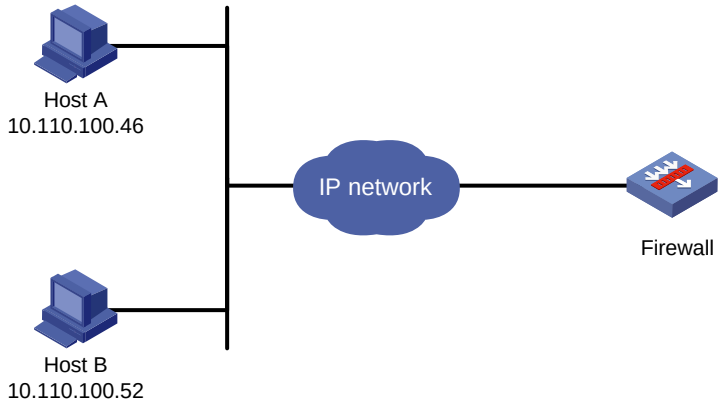
Task	Command	Remarks
Display the current login users.	**display web users**	Available in user interface view.
Log off online Web users.	**free web-users** { **all** | **user-id** *user-id* | **user-name** *user-name* }	Available in user interface view.

Web login control configuration example

Network requirements

Configure the firewall in Figure 80 to provide Web access service only to Host B.

Figure 80 Network diagram



Configuration procedure

Create ACL 2030, and configure rule 1 to permit packets sourced from Host B.

```
<Firewall> system-view
[Firewall] acl number 2030 match-order config
[Firewall-acl-basic-2030] rule 1 permit source 10.110.100.52 0
```

Associate the ACL with the HTTP service so only the Web users on Host B can access the firewall.

```
[Firewall] ip http acl 2030
```

Displaying online users

Online users refer to the users who have passed authentication and got online. You can view information about online users on the Web page of the device.

To display online users, select **User** > **Online User** from the navigation tree.

Figure 81 Online users

User ID	User Name	IP Address	User Type	Login Time	Online Duration
2	syy@system	192.168.1.16	Admin	2000-04-26 18:15:25	02h24m36s
4	syy@system	192.168.1.16	Admin	2000-04-26 20:03:48	00h36m14s

Table 21 Online user fields

Field	Description
User ID	Identity of the online user in the system.
User Name	Username used for authentication.
IP Address	IP address of the user's host.
User Type	Access type of the online user, including PPP, Portal, Admin (Telnet or Web), and L2TP. The Web page does not display FTP users.
Login Time	User login time.
Online Duration	Elapsed time after user login.

Using the CLI

At the command-line interface (CLI), you can enter text commands to configure, manage, and monitor your device.

Figure 82 CLI example

```
******************************************************************************
* Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P.          *
* Without the owner's prior written consent,                                 *
* no decompiling or reverse-engineering shall be allowed.                    *
******************************************************************************

<HP>
```

You can log in to the CLI in a variety of ways. For example, you can log in through the console port, or using Telnet or SSH. For more information about login methods, see "Logging in to the CLI."

Command conventions

Command conventions help you understand the syntax of commands. Commands in product manuals comply with the conventions listed in Table 22.

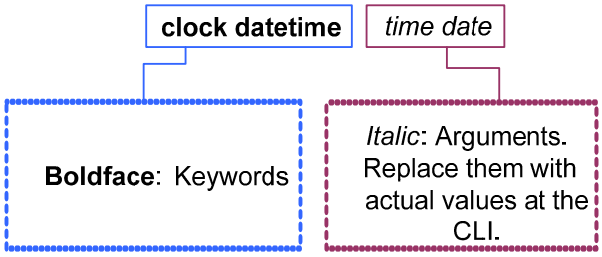
Table 22 Command conventions

Convention	Description
Boldface	**Bold** text represents commands and keywords that you enter literally as shown.
Italic	*Italic* text represents arguments that you replace with actual values.
[ ]	Square brackets enclose syntax choices (keywords or arguments) that are optional.
{ x | y | ... }	Braces enclose a set of required syntax choices separated by vertical bars, from which you select one.
[x | y | ...]	Square brackets enclose a set of optional syntax choices separated by vertical bars, from which you select one or none.
{ x | y | ... } *	Asterisk marked braces enclose a set of required syntax choices separated by vertical bars, from which you select at least one.
[x | y | ...] *	Asterisk marked square brackets enclose optional syntax choices separated by vertical bars, from which you select one choice, multiple choices, or none.
&<1-n>	The argument or keyword and argument combination before the ampersand (&) sign can be entered 1 to n times.
#	A line that starts with a pound (#) sign is comments.

Command keywords are case insensitive.

The following example analyzes the syntax of the **clock datetime** *time date* command according to Table 22.

Figure 83 Understanding command-line parameters



For example, to set the system time to 10:30:20, February 23, 2010, enter the following command line at the CLI and press **Enter**:

```
<Sysname> clock datetime 10:30:20 2/23/2010
```

Using the undo form of a command

Most configuration commands have an **undo** form for canceling a configuration, restoring the default, or disabling a feature. For example, the **info-center enable** command enables the information center, and the **undo info-center enable** command disables the information center.

CLI views

Commands are grouped in different views by function. To use a command, you must enter its view.

CLI views are hierarchically organized, as shown in Figure 84. Each view has a unique prompt, from which you can identify where you are and what you can do. For example, the prompt `[Sysname-vlan100]` shows that you are in VLAN 100 view and can configure attributes for that VLAN.

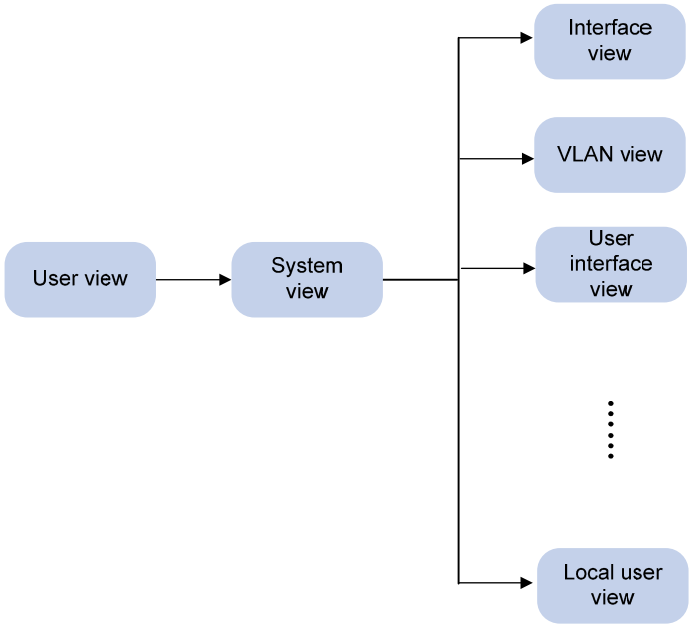
You are placed in user view immediately after you are logged in to the CLI. The user view prompt is <*Device-name*>, where the *Device-name* argument, representing the device hostname, defaults to **Sysname** and can be changed by using the **sysname** command. In user view, you can perform basic operations including display, debug, file management, FTP, Telnet, clock setting, and reboot.

From user view, you can enter system view to configure global settings, including the daylight saving time, banners, and hotkeys. The system view prompt is [*Device-name*].

From system view, you can enter different function views. For example, you can enter interface view to configure interface parameters, enter VLAN view to add ports to the specific VLAN, enter user interface view to configure login user attributes, or create a local user and enter local user view to configure attributes for the local user.

To display all commands available in a view, enter a question mark (?) at the view prompt.

Figure 84 CLI view hierarchy



Entering system view from user view

Task	Command
Enter system view from user view.	**system-view**

Returning to the upper-level view from any view

Task	Command
Return to the upper-level view from any view.	**quit**

Executing the **quit** command in user view terminates your connection to the device.

In public key code view, use the **public-key-code end** command to return to the upper-level view (public key view). In public key view, use the **peer-public-key end** command to return to system view.

Returning to user view from any other view

You can return directly to user view from any other view by using the **return** command or pressing **Ctrl+Z**, instead of using the **quit** command multiple times.

To return to user view from any other view:

Task	Command
Return to user view.	**return**

Accessing the CLI online help

The CLI online help is context sensitive. You can enter a question mark at any prompt or in any position of a command to display all available options.

To access the CLI online help, use one of the following methods:

- Enter a question mark at a view prompt to display the first keyword of every command available in the view. For example:

```
<Sysname> ?
User view commands:
  archive           Specify archive settings
  backup            Backup next startup-configuration file to TFTP server
  boot-loader       Set boot loader
  bootrom           Update/read/backup/restore bootrom
  cd                Change current directory
...
```

- Enter a space and a question mark after a command keyword to display all available, subsequent keywords and arguments.
  - If you type a question mark in place of a keyword, the CLI displays all possible keyword matches with a brief description for each keyword. For example:

```
<Sysname> terminal ?
  debugging  Send debug information to terminal
  logging    Send log information to terminal
  monitor    Send information output to current terminal
  trapping   Send trap information to terminal
```

  - If you type a question mark in place of an argument, the CLI displays the description of this argument. For example:

```
<Sysname> system-view
[Sysname] interface vlan-interface ?
  <1-4094>  VLAN interface number
[Sysname] interface vlan-interface 1 ?
  <cr>
[Sysname] interface vlan-interface 1
```

    The string **<cr>** indicates that the command is complete, and you can press **Enter** to execute the command.

- Enter an incomplete keyword string followed by a question mark to display all keywords starting with the string. For example:

```
<Sysname> f?
   fdisk
   fixdisk
   format
   free
   ftp
<Sysname> display ftp?
   ftp
   ftp-server
   ftp-user
```

Entering a command

When you enter a command, you can use keys or hotkeys to edit the command line, or use abbreviated keywords or keyword aliases.

Editing a command line

Use the keys listed in Table 23 or the hotkeys listed in Table 24 to edit a command line.

Table 23 Command line editing keys

Key	Function
Common keys	If the edit buffer is not full, pressing a common key inserts the character at the position of the cursor and moves the cursor to the right.
Backspace	Deletes the character to the left of the cursor and moves the cursor back one character.
Left arrow key or **Ctrl+B**	Moves the cursor one character to the left.
Right arrow key or **Ctrl+F**	Moves the cursor one character to the right.
Tab	If you press **Tab** after entering part of a keyword, the system automatically completes the keyword: • If a unique match is found, the system substitutes the complete keyword for the incomplete one and displays what you entered in the next line. • If there is more than one match, you can press **Tab** multiple times to pick the keyword you want to enter. • If there is no match, the system does not modify what you entered but displays it again in the next line.

Entering a STRING type value for an argument

A STRING type argument value can contain any printable character (ASCII code in the range of 32 to 126) except the question mark (?), quotation mark ("), backward slash (\), and space.

For example, the domain name is of the STRING type. You can give it a value such as **forVPN1**.

```
<Sysname> system-view
[Sysname] domain ?
  STRING<1-24>  Domain name
```

Abbreviating commands

You can enter a command line quickly by entering incomplete keywords that uniquely identify the complete command.

In user view, for example, commands starting with an **s** include **startup saved-configuration** and **system-view**. To enter the command **system-view**, you only need to type **sy**. To enter the command **startup saved-configuration**, type **st s**.

You can also press **Tab** to complete an incomplete keyword.

Configuring and using command keyword aliases

The command keyword alias function allows you to replace the first keyword of a non-undo command or the second keyword of an **undo** command with your preferred keyword when you execute the command. For example, if you configure **show** as the alias for the **display** keyword, you can enter **show** in place of **display** to execute a **display** command.

Usage guidelines

- After you successfully execute a command by using a keyword alias, the system saves the keyword, instead of its alias, to the running configuration.
- If you press **Tab** after entering part of an alias, the keyword is displayed.
- If a string you entered partially matches a keyword and an alias, the command indicated by the alias is executed. To execute the command indicated by the keyword, enter the complete keyword.
- If you enter a string that partially matches multiple aliases, the system gives you a prompt.

Configuration procedure

To configure a command keyword alias:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enable the command keyword alias function.	**command-alias enable**	By default, the command keyword alias function is disabled.
3.	Configure a command keyword alias.	**command-alias mapping** *cmdkey alias*	By default, no command keyword alias is configured. You must enter the *cmdkey* and *alias* arguments in their complete form.

Configuring and using hotkeys

To facilitate CLI operation, the system defines the hotkeys shown in Table 24 and provides five configurable command hotkeys. Pressing a command hotkey is the same as entering a command.

To configure a command hotkey:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Configure hotkeys.	**hotkey** { **CTRL_G** | **CTRL_L** | **CTRL_O** | **CTRL_T** | **CTRL_U** } *command*	By default: • **Ctrl+G** is assigned the **display current-configuration** command. • **Ctrl+L** is assigned the **display ip routing-table** command. • **Ctrl+O** is assigned the **undo debugging all** command. • No command is assigned to **Ctrl+T** or **Ctrl+U**.

Step	Command	Remarks
3. Display hotkeys.	**display hotkey** [| { **begin** | **exclude** | **include** } *regular-expression*]	Optional. Available in any view. See Table 24 for hotkeys reserved by the system.

The hotkeys in Table 24 are defined by the device. If a hotkey is also defined by the terminal software that you are using to interact with the device, the definition of the terminal software takes effect.

Table 24 System-reserved hotkeys

Hotkey	Function
Ctrl+A	Moves the cursor to the beginning of a line.
Ctrl+B	Moves the cursor one character to the left.
Ctrl+C	Stops the current command.
Ctrl+D	Deletes the character at the cursor.
Ctrl+E	Moves the cursor to the end of a line.
Ctrl+F	Moves the cursor one character to the right.
Ctrl+H	Deletes the character to the left of the cursor.
Ctrl+K	Aborts the connection request.
Ctrl+N	Displays the next command in the command history buffer.
Ctrl+P	Displays the previous command in the command history buffer.
Ctrl+R	Redisplays the current line.
Ctrl+V	Pastes text from the clipboard.
Ctrl+W	Deletes the word to the left of the cursor.
Ctrl+X	Deletes all characters to the left of the cursor.
Ctrl+Y	Deletes all characters to the right of the cursor.
Ctrl+Z	Returns to user view.
Ctrl+]	Terminates an incoming connection or a redirect connection.
Esc+B	Moves the cursor back one word.
Esc+D	Deletes all characters from the cursor to the end of the word.
Esc+F	Moves the cursor forward one word.
Esc+N	Moves the cursor down one line. This hotkey is available before you press **Enter**.
Esc+P	Moves the cursor up one line. This hotkey is available before you press **Enter**.
Esc+<	Moves the cursor to the beginning of the clipboard.
Esc+>	Moves the cursor to the ending of the clipboard.

Enabling redisplaying entered-but-not-submitted commands

The redisplay entered-but-not-submitted commands feature enables the system to display what you have typed (except **Yes** or **No** for confirmation) at the CLI when your configuration is interrupted by system

output such as logs. If you have entered nothing, the system does not display the command-line prompt after the output.

To enable redisplaying entered-but-not-submitted commands:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enable redisplaying entered-but-not-submitted commands.	**info-center synchronous**	By default, this feature is disabled. For more information about this command, see *System Management and Maintenance Command Reference*.

Understanding command-line error messages

When you press **Enter** to submit a command, the command line interpreter first examines the command syntax. If the command passes syntax check, the CLI executes the command. If not, the CLI displays an error message.

Table 25 Common command-line error messages

Error message	Cause
% Unrecognized command found at '^' position.	The keyword in the marked position is invalid.
% Incomplete command found at '^' position.	One or more required keywords or arguments are missing.
% Ambiguous command found at '^' position.	The entered character sequence matches more than one command.
Too many parameters	The entered character sequence contains excessive keywords or arguments.
% Wrong parameter found at '^' position.	The argument in the marked position is invalid.

Using the command history function

The system can automatically save successfully executed commands to the command history buffer for the current user interface. You can view them and execute them again, or set the maximum number of commands that can be saved in the command history buffer.

A command is saved to the command history buffer in the exact format as it was entered. For example, if you enter an incomplete command, the command saved in the command history buffer is also incomplete; if you enter a command by using a command keyword alias, the command saved in the command history buffer also uses the alias.

If you enter a command in the same format multiple times in succession, the system buffers the command only once. If you enter a command multiple times in different formats, the system buffers each command format. For example, **display cu** and **display current-configuration** are buffered as two entries but successive repetitions of **display cu** create only one entry in the buffer.

By default, the command history buffer can save up to 10 commands for each user. To set the capacity of the command history buffer for the current user interface, use the **history-command max-size** command.

Viewing history commands

You can use arrow keys to access history commands in Windows 200x and Windows XP Terminal or Telnet. In Windows 9x HyperTerminal, the arrow keys are invalid, and you must use **Ctrl+P** and **Ctrl+N** instead.

To view command history, use one of the following methods:

Task	Command
Display all commands in the command history buffer.	**display history-command** [| { **begin** | **exclude** | **include** } *regular-expression*]
Display the previous history command.	Up arrow key or **Ctrl+P**
Display the next history command.	Down arrow key or **Ctrl+N**

Setting the command history buffer size for user interfaces

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enter user interface view.	**user-interface** { *first-num1* [*last-num1*] | { **console** | **vty** } *first-num2* [*last-num2*] }	N/A
3.	Set the maximum number of commands that can be saved in the command history buffer.	**history-command max-size** *size-value*	Optional. By default, the command history buffer can save up to 10 commands.

Controlling the CLI output

This section describes the CLI output control features that help you quickly identify the desired output.

Pausing between screens of output

If the output being displayed is more than will fit on one screen, the system automatically pauses after displaying a screen. By default, up to 24 lines can be displayed on a screen. To change the screen length, use the **screen-length** *screen-length* command. For more information about this command, see *Getting Started Command Reference*. To control output, use keys in Table 26.

Table 26 Keys for controlling output

Keys	Function
Space	Displays the next screen.
Enter	Displays the next line.
Ctrl+C	Stops the display and cancels the command execution.
<PageUp>	Displays the previous page.
<PageDown>	Displays the next page.

To display all output at one time and refresh the screen continuously until the last screen is displayed:

Task	Command	Remarks
Disable pausing between screens of output for the current session.	**screen-length disable**	The default for a session depends on the setting of the **screen-length** command in user interface view. The default of the **screen-length** command is pausing between screens of output and displaying up to 24 lines on a screen. This command is executed in user view and takes effect only for the current session. When you relog in to the device, the default is restored.

Filtering the output from a display command

You can use one of the following methods to filter the output from a **display** command:

- Specify the **|** { **begin** | **exclude** | **include** } *regular-expression* option at the end of the command.
- When the system pauses after displaying a screen of output, enter a forward slash (/), minus sign (-), or plus sign (+), and a regular expression to filter subsequent output. The forward slash equals the keyword **begin**, the minus sign equals the keyword **exclude**, and the plus sign equals the keyword **include**.

The following definitions apply to the **begin**, **exclude**, and **include** keywords:

- **begin**—Displays the first line that matches the specified regular expression and all lines that follow.
- **exclude**—Displays all lines that do not match the specified regular expression.
- **include**—Displays all lines that match the specified regular expression.

A regular expression is a case-sensitive string of 1 to 256 characters that supports the special characters in Table 27.

Table 27 Special characters supported in a regular expression

Character	Meaning	Examples
^string	Matches the beginning of a line.	"^user" matches all lines beginning with "user". A line beginning with "Auser" is not matched.
string$	Matches the end of a line.	"user$" matches lines ending with "user". A line ending with "userA" is not matched.
.	Matches any single character, such as a single character, a special character, and a blank.	".s" matches both "as" and "bs".
*	Matches the preceding character or character group zero or multiple times.	"zo*" matches "z" and "zoo", and "(zo)*" matches "zo" and "zozo".
+	Matches the preceding character or character group one or multiple times	"zo+" matches "zo" and "zoo", but not "z".
|	Matches the preceding or succeeding character string	"def|int" only matches a character string containing "def" or "int".

Character	Meaning	Examples
_	If it is at the beginning or the end of a regular expression, it equals ^ or $. In other cases, it equals comma, space, round bracket, or curly bracket.	"a_b" matches "a b" or "a(b"; "_ab" only matches a line starting with "ab"; "ab_" only matches a line ending with "ab".
-	It connects two values (the smaller one before it and the bigger one after it) to indicate a range together with [ ].	"1-9" means 1 to 9 (inclusive); "a-h" means a to h (inclusive).
[ ]	Matches a single character contained within the brackets.	[16A] matches a string containing any character among 1, 6, and A; [1-36A] matches a string containing any character among 1, 2, 3, 6, and A (- is a hyphen). To match the character "]", put it at the beginning of a string within brackets, for example [ ]*string*]. There is no such limit on "[".
( )	A character group. It is usually used with "+" or "*".	(123A) means a character group "123A"; "408(12)+" matches 40812 or 408121212. But it does not match 408.
\index	Repeats the character string specified by the index. A character string refers to the string within () before \. *index* refers to the sequence number (starting from 1 from left to right) of the character group before \. If only one character group appears before \, *index* can only be 1; if n character groups appear before *index*, *index* can be any integer from 1 to n.	(*string*)\1 repeats *string*, and a matching string must contain *stringstring*. (*string1*)(*string2*)\2 repeats *string2*, and a matching string must contain *string1string2string2*. (*string1*)(*string2*)\1\2 repeats *string1* and *string2* respectively, and a matching string must contain *string1string2string1string2*.
[^]	Matches a single character not contained within the brackets.	[^16A] means to match a string containing any character except 1, 6 or A, and the matching string can also contain 1, 6 or A, but cannot contain these three characters only. For example, [^16A] matches "abc" and "m16", but not 1, 16, or 16A.
\<string	Matches a character string starting with *string*.	"\<do" matches word "domain" and string "doa".
string\>	Matches a character string ending with *string*.	"do\>" matches word "undo" and string "abcdo".
\bcharacter2	Matches *character1character2*. *character1* can be any character except number, letter or underline, and \b equals [^A-Za-z0-9_].	"\ba" matches "-a" with "-" being *character1*, and "a" being *character2*, but it does not match "2a" or "ba".
\Bcharacter	Matches a string containing *character*, and no space is allowed before *character*.	"\Bt" matches "t" in "install", but not "t" in "big top".

Character	Meaning	Examples
character1\w	Matches *character1character2*. *character2* must be a number, letter, or underline, and \w equals [A-Za-z0-9_].	"v\w" matches "**vl**an" ("v" is *character1* and "l" is *character2*) and "ser**vi**ce" ("i" is *character2*).
\W	Equals \b.	"\Wa" matches "-a", with "-" being *character1*, and "a" being *character2, but does not* match "2a" or "ba".
\	Escape character. If a special character listed in this table follows \, the specific meaning of the character is removed.	"\\" matches a string containing "\", "\^" matches a string containing "^", and "\\b" matches a string containing "\b".

The following are several regular expression examples:

Use **| begin user-interface** in the **display current-configuration** command to match the first line of output that contains **user-interface** to the last line of output.

```
<Sysname> display current-configuration | begin user-interface
user-interface con 0
user-interface vty 0 4
 authentication-mode none
 user privilege level 3
#
return
```

Use **| exclude Direct** in the **display ip routing-table** command to filter out direct routes and display only the non-direct routes.

```
<Sysname> display ip routing-table | exclude Direct
Routing Tables: Public

Destination/Mask    Proto  Pre  Cost        NextHop         Interface

1.1.1.0/24          Static 60   0           192.168.0.0     Vlan1
```

Use **| include Vlan** in the **display ip routing-table** command to filter in route entries that contain **Vlan**.

```
<Sysname> display ip routing-table | include Vlan
Routing Tables: Public

Destination/Mask    Proto  Pre  Cost        NextHop         Interface

192.168.1.0/24      Direct 0    0           192.168.1.42    Vlan999
```

Configuring user privilege and command levels

To avoid unauthorized access, the device defines the user privilege levels and command levels in Table 28. User privilege levels correspond to command levels. A user logged in with a specific privilege level can use only the commands at that level or lower levels.

Table 28 Command levels and user privilege levels

Level	Privilege	Default set of commands
0	Visit	Includes commands for network diagnosis and commands for accessing an external device. Configuration of commands at this level cannot survive a device restart. Upon device restart, the commands at this level are restored to the default settings. Commands at this level include **ping**, **tracert**, **telnet** and **ssh2**.
1	Monitor	Includes commands for system maintenance and service fault diagnosis. Commands at this level are not saved after being configured. After the device is restarted, the commands at this level are restored to the default settings. Commands at this level include **debugging**, **terminal**, **refresh**, and **send**.
2	System	Includes service configuration commands, including routing configuration commands and commands for configuring services at different network levels. By default, commands at this level include all configuration commands except for those at manage level.
3	Manage	Includes commands that influence the basic operation of the system and commands for configuring system support modules. By default, commands at this level involve the configuration commands of file system, FTP, TFTP, Xmodem download, user management, level setting, and parameter settings within a system, which are not defined by any protocols or RFCs.

Configuring a user privilege level

If the authentication mode on a user interface is scheme, configure a user privilege level for the user interface's users through the AAA module or directly on the user interface. For SSH users who use public-key authentication, the user privilege level configured directly on the user interface always takes effect. For other users, the user privilege level configured in the AAA module has priority over the one configured directly on the user interface.

If the authentication mode on a user interface is none or password, configure the user privilege level directly on the user interface.

For more information about user login authentication, see "Logging in to the CLI." For more information about AAA and SSH, see *Access Control Configuration Guide*.

Configuring a user privilege level for users through the AAA module

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Enter user interface view.	**user-interface** { *first-num1* [*last-num1*] | { **console** | **vty** } *first-num2* [*last-num2*] }	N/A
3.	Specify the scheme authentication mode.	**authentication-mode scheme**	By default, the authentication mode for VTY users is **scheme**, and no authentication is needed for console login users.
4.	Return to system view.	**quit**	N/A

Step	Command	Remarks
5. Configure the authentication mode for SSH users as **password**.	For more information, see *System Management and Maintenance Configuration Guide*.	This task is required only for SSH users who are required to provide their usernames and passwords for authentication.
6. Configure the user privilege level through the AAA module.	• To use local authentication: a. Use the **local-user** command to create a local user and enter local user view. b. Use the **level** keyword in the **authorization-attribute** command to configure the user privilege level. • To use remote authentication (RADIUS, HWTACACS, or LDAP): Configure the user privilege level on the authentication server.	User either approach. For local authentication, if you do not configure the user privilege level, the user privilege level is 0. For remote authentication, if you do not configure the user privilege level, the user privilege level depends on the default configuration of the authentication server. For more information about the **local-user** and **authorization-attribute** commands, see *Access Control Command Reference*.

For example:

Configure the device to use local authentication for Telnet users on VTY 1.

```
<Sysname> system-view
[Sysname] user-interface vty 1
[Sysname-ui-vty1] authentication-mode scheme
[Sysname-ui-vty1] quit
[Sysname] local-user test
[Sysname-luser-test] password simple 123
[Sysname-luser-test] service-type telnet
```

When users Telnet to the device through VTY 1, they must enter username **test** and password **123**. After passing the authentication, the users can only use level-0 commands.

Assign commands of levels 0 through 3 to the users.

```
[Sysname-luser-test] authorization-attribute level 3
```

Configuring the user privilege level directly on a user interface

To configure the user privilege level directly on a user interface that uses the scheme authentication mode:

Step	Command	Remarks
1. Configure the authentication type for SSH users as **publickey**.	For more information, see *System Management and Maintenance Configuration Guide*.	Required only for SSH users who use public-key authentication.
2. Enter system view.	**system-view**	N/A
3. Enter user interface view.	**user-interface** { *first-num1* [*last-num1*] | **vty** *first-num2* [*last-num2*] }	N/A
4. Enable the scheme authentication mode.	**authentication-mode scheme**	By default, the authentication mode for VTY users is **scheme**, and no authentication is needed for console users.

Step	Command	Remarks
5. Configure the user privilege level.	**user privilege level** *level*	By default, the user privilege level for users logged in through the console user interface is 3, and that for users logged in through the other user interfaces is 0.

To configure the user privilege level directly on a user interface that uses the **none** or **password** authentication mode:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter user interface view.	**user-interface** { *first-num1* [*last-num1*] | { **console** | **vty** } *first-num2* [*last-num2*] }	N/A
3. Configure the authentication mode for any user who uses the current user interface to log in to the device.	**authentication-mode** { **none** | **password** }	Optional. By default, the authentication mode for VTY user interfaces is **scheme**, and no authentication is needed for console users.
4. Configure the privilege level of users logged in through the current user interface.	**user privilege level** *level*	Optional. By default, the user privilege level for users logged in through the console user interface is 3, and that for users logged in through the other user interfaces is 0.

For example:

Display the commands a Telnet user can use by default after login.

```
<Sysname> ?
User view commands:
  display  Display current system information
  ping     Ping function
  quit     Exit from current command view
  rsh      Establish one RSH connection
  ssh2     Establish a secure shell client connection
  super    Set the current user priority level
  telnet   Establish one TELNET connection
  tftp     Open TFTP connection
  tracert  Trace route function
```

Configure the device to perform no authentication for Telnet users, and to authorize authenticated Telnet users to use level-0 and level-1 commands. (Use no authentication mode only in a secure network environment.)

```
<Sysname> system-view
[Sysname] user-interface vty 0 4
[Sysname-ui-vty0-4] authentication-mode none
[Sysname-ui-vty0-4] user privilege level 1
```

Display the commands a Telnet user can use after login. Because the user privilege level is 1, a Telnet user can use more commands now.

```
<Sysname> ?
User view commands:
  debugging      Enable system debugging functions
  dialer         Dialer disconnect
  display        Display current system information
  ping           Ping function
  quit           Exit from current command view
  refresh        Do soft reset
  reset          Reset operation
  rsh            Establish one RSH connection
  screen-length  Specify the lines displayed on one screen
  send           Send information to other user terminal interface
  ssh2           Establish a secure shell client connection
  super          Set the current user priority level
  telnet         Establish one TELNET connection
  terminal       Set the terminal line characteristics
  tftp           Open TFTP connection
  tracert        Trace route function
  undo           Cancel current setting
```

Configure the device to perform password authentication for Telnet users, and to authorize authenticated Telnet users to use the commands of privilege levels 0, 1, and 2.

```
<Sysname> system-view
[Sysname] user-interface vty 0 4
[Sysname-ui-vty1] authentication-mode password
[Sysname-ui-vty0-4] set authentication password simple 123
[Sysname-ui-vty0-4] user privilege level 2
```

After the configuration is complete, when users Telnet to the device, they must enter the password **12345678**. After passing authentication, they can use commands of levels 0, 1, and 2.

Switching the user privilege level

Users can switch to a different user privilege level without logging out and terminating the current connection. After the privilege level switching, users can continue to manage the device without relogging in, but the commands they can execute have changed. For example, with the user privilege level 3, a user can configure system parameters. After switching to user privilege level 0, the user can execute only basic commands like **ping** and **tracert** and use a few **display** commands. The switching operation is effective for the current login. After the user relogs in, the user privilege restores to the original level.

To avoid problems, HP recommends that administrators log in with a lower privilege level to view switch operating parameters, and switch to a higher level temporarily only when they must maintain the device.

When administrators must leave for a while or ask someone else to manage the device temporarily, they can switch to a lower privilege level before they leave to restrict the operation by others.

Configuring the authentication parameters for user privilege level switching

A user can switch to a lower privilege level without authentication. To switch to a higher privilege level, however, a user must provide the privilege level switching authentication information (if any). Table 29 shows the privilege level switching authentication modes supported by the device.

Table 29 Privilege level switching authentication modes

Authentication mode	Keywords	Description
Local password authentication only (local-only)	**local**	The device uses the locally configured passwords for privilege level switching authentication. To use this mode, you must set the passwords for privilege level switching using the **super password** command.
Remote AAA authentication through HWTACACS or RADIUS	**scheme**	The device sends the username and password for privilege level switching to the HWTACACS or RADIUS server for remote authentication. To use this mode, you must perform the following configuration tasks: • Configure the required HWTACACS or RADIUS schemes and configure the ISP domain to use the schemes for users. For more information, see *Access Control Configuration Guide*. • Add user accounts and specify the user passwords on the HWTACACS or RADIUS server.
Local password authentication first and then remote AAA authentication	**local** **scheme**	The device first uses the locally configured passwords for privilege level switching authentication. If no local password is set, the device allows console users to switch their privilege levels without authentication, but performs AAA authentication for VTY users.
Remote AAA authentication first and then local password authentication	**scheme** **local**	AAA authentication is performed first, and if the remote HWTACACS or RADIUS server does not respond or AAA configuration on the device is invalid, the local password authentication is performed.

To configure the authentication parameters for a user privilege level:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Set the authentication mode for user privilege level switching.	**super authentication-mode** { **local** | **scheme** } *	Optional. By default, local-only authentication is used.
3. Configure the password for the user privilege level.	**super password** [**level** *user-level*] { **cipher** | **simple** } *password*	If local authentication is involved, this step is required. By default, a privilege level has no password. If no user privilege level is specified when you configure the command, the user privilege level defaults to 3.

If local-only authentication is used, a console user interface user can switch to a higher privilege level, even if the privilege level has not been assigned a password.

Switching to a higher user privilege level

Before you switch to a higher user privilege level, obtain the required authentication data as described in Table 30.

The privilege level switching fails after three consecutive unsuccessful password attempts.

To switch the user privilege level, perform the following task in user view:

Task	Command	Remarks
Switch the user privilege level.	**super** [*level*]	When logging in to the device, a user has a user privilege level, which depends on user interface or authentication user level.

Table 30 Information required for user privilege level switching

User interface authentication mode	User privilege level switching authentication mode	Information required for the first authentication mode	Information required for the second authentication mode
none/password	**local**	Password configured for the privilege level on the device with the **super password** command.	N/A
	local scheme	Password configured for the privilege level on the device with the **super password** command.	Username and password configured on the AAA server for the privilege level.
	scheme	Username and password for the privilege level.	N/A
	scheme local	Username and password for the privilege level.	Local user privilege level switching password.
scheme	**local**	Password configured for the privilege level on the device with the **super password** command.	N/A
	local scheme	Password configured for the privilege level on the device with the **super password** command.	Password for privilege level switching configured on the AAA server. The system uses the login username as the privilege level switching username.
	scheme	Password for privilege level switching configured on the AAA server. The system uses the login username as the privilege level switching username.	N/A
	scheme local	Password for privilege level switching configured on the AAA server. The system uses the login username as the privilege level switching username.	Password configured on the device with the **super password** command for the privilege level.

Changing the level of a command

Every command in a view has a default command level. The default command level scheme is sufficient for the security and ease of maintenance requirements of most networks. If you want to change the level of a command, make sure the change does not result in any security risk or maintenance problem.

To change the level of a command:

Step		Command	Remarks
1.	Enter system view.	**system-view**	N/A
2.	Change the level of a command in a specific view.	**command-privilege level** *level* **view** *view command*	See Table 28 for the default settings.

Saving the running configuration

You can use the **save** command in any view to save all submitted and executed commands into the configuration file. Commands saved in the configuration file can survive a reboot. The **save** command does not take effect on one-time commands, including **display** and **reset** commands. One-time commands are never saved.

Displaying and maintaining CLI

Task	Command	Remarks
Display the command keyword alias configuration.	**display command-alias** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.
Display data in the clipboard.	**display clipboard** [**|** { **begin** | **exclude** | **include** } *regular-expression*]	Available in any view.

Support and other resources

Contacting HP

For worldwide technical support information, see the HP support website:

http://www.hp.com/support

Before contacting HP, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

http://www.hp.com/go/wwalerts

After registering, you will receive email notification of product enhancements, new driver versions, firmware updates, and other product resources.

Related information

Documents

To find related documents, browse to the Manuals page of the HP Business Support Center website:

http://www.hp.com/support/manuals

- For related documentation, navigate to the Networking section, and select a networking category.
- For a complete list of acronyms and their definitions, see *HP FlexNetwork Technology Acronyms*.

Websites

- HP.com http://www.hp.com
- HP Networking http://www.hp.com/go/networking
- HP manuals http://www.hp.com/support/manuals
- HP download drivers and software http://www.hp.com/support/downloads
- HP software depot http://www.software.hp.com
- HP Education http://www.hp.com/learn

Conventions

This section describes the conventions used in this documentation set.

Command conventions

Convention	Description
Boldface	**Bold** text represents commands and keywords that you enter literally as shown.
Italic	*Italic* text represents arguments that you replace with actual values.
[ ]	Square brackets enclose syntax choices (keywords or arguments) that are optional.
{ x | y | ... }	Braces enclose a set of required syntax choices separated by vertical bars, from which you select one.
[x | y | ...]	Square brackets enclose a set of optional syntax choices separated by vertical bars, from which you select one or none.
{ x | y | ... } *	Asterisk-marked braces enclose a set of required syntax choices separated by vertical bars, from which you select at least one.
[x | y | ...] *	Asterisk-marked square brackets enclose optional syntax choices separated by vertical bars, from which you select one choice, multiple choices, or none.
&<1-n>	The argument or keyword and argument combination before the ampersand (&) sign can be entered 1 to n times.
#	A line that starts with a pound (#) sign is comments.

GUI conventions

Convention	Description
Boldface	Window names, button names, field names, and menu items are in bold text. For example, the **New User** window appears; click **OK**.
>	Multi-level menus are separated by angle brackets. For example, **File** > **Create** > **Folder**.

Symbols

Convention	Description
WARNING	An alert that calls attention to important information that if not understood or followed can result in personal injury.
CAUTION	An alert that calls attention to important information that if not understood or followed can result in data loss, data corruption, or damage to hardware or software.
IMPORTANT	An alert that calls attention to essential information.
NOTE	An alert that contains additional or supplementary information.
TIP	An alert that provides helpful information.

Network topology icons

	Represents a generic network device, such as a router, switch, or firewall.
	Represents a routing-capable device, such as a router or Layer 3 switch.
	Represents a generic switch, such as a Layer 2 or Layer 3 switch, or a router that supports Layer 2 forwarding and other Layer 2 features.
	Represents a firewall product or a UTM device.

Port numbering in examples

The port numbers in this document are for illustration only and might be unavailable on your device.

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